SEEDS OF LIFE
PHASE III

(SoL III)

PROGRAM DESIGN DOCUMENT

Volume 2

APPENDICES

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ABBREVIATIONS AND ACRONYMS

ACIAR	Australian Centre for International Agriculture Research
AP	Annual Plan
APC	Australian Program Coordinator
AusAID	Australian Agency for International Development
CGIAR	Consultative Group on International Agricultural Research
CLIMA	Centre for Legumes in Mediterranean Agriculture (UWA)
CSPG	Community Seed Production Group
DG	Director General (of MAF)
DPs	Development Partners
EC	European Commission
EIRR	Economic Internal Rate of Return
EoPOs	End-of-Program Outcomes
EU	European Union
FAO	Food and Agriculture Organization
FSMG	Farmer Seed Marketing Group
GDP	Gross Domestic Product

GoA	Government of Australia
GoTL	Government of Timor-Leste
GTZ	Gesellschaft fur Technisch Zusammenarbeit (German Agency for Technical Cooperation)
LT	Long Term
M&E	Monitoring and Evaluation
MAF	Ministry of Agriculture and Fisheries
MEF	M&E Framework
Mt	Metric tonne (1,000 kg)
MTR	Mid Term Review
NDA&H	National Directorate of Agriculture and Horticulture (MAF)
NDACD	National Directorate of Agricultural Community Development (MAF)
NDP	National Development Plan (replaced by National Strategic Plan in April 2010)
NDP&P	National Directorate of Policy and Programming (MAF)
NDR&SS	National Directorate of Research and Special Services (MAF)
NGOs	Non-Governmental Organizations
NPM	National Program Manager (East Timorese)
NPP	New Policy Program (AusAID funding mechanism)
OFDTs	On-Farm Demonstrations and Trials
PDD	Program Design Document
PMU	Program Management Unit
PSC	Program Steering Committee
PY	Program Year
RDPs	Rural Development Programs – II, III and IV (EU-funded)
SDP	Strategic Development Plan (Prime Minister's National Development Plan)
SEOs	*Suco* Extension Officer (MAF extension officer)
SoL I	Seeds of Life I (AusAID)
SoL II	Seeds of Life II (AusAID)
SoL III	Seeds of Life III (AusAID)
SoLTL	Seeds of Life Team Leader (Australian)
SOSEK	Social Science and Economics Unit within SoL
SPC	Seed Processing Centre
SPOs	Seed Production Officers
ST	Short Term
TA	Technical Assistance
TAG	Technical Advisory Group
TL	Timor-Leste
UWA	University of Western Australia
WHHs	Women-headed Households

APPENDIX 1

SEED PRODUCTION AND DISTRIBUTION SYSTEMS

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1. INTRODUCTION

'Formal seed systems' manage seed as a distinct product (from food), and involve a chain of processes and distinct actor roles, to develop new varieties, produce seed, and maintain its quality. These systems generally involve public-sector agencies and regulated private-sector actors. 'Informal seed systems' have broadly similar functions, though involve many more and diverse actors, may not always manage 'seed' as a separate product, and lie outside regulatory structures (hence the term)[1]. SoL III aims to strengthen both formal and informal seed systems in order to maximise farmers' access to good-quality seed from the program, and thus achieve the widest possible impact. Support to formal and informal seed production and distribution aims to achieve an integrated national system, balancing support to each system and targeting activities for both systems so that they complement each other.

The rationale for supporting both systems is broader than simply using the informal system for onward dissemination of outputs from the formal system. There is a clear public-good case for state support to formal systems to ensure a supply of high-value seeds, but there needs to be limits to its scale. Formal seed production is expensive, can be vulnerable to production variation, poor regulation/management of quality, and budget cuts. It also may not guarantee that the poorest have access to seed. Despite decades of formal seed system development in other Southern countries, world-wide the informal system still supplies at least 80-90% of all planting material to farmers.[2] This clearly shows informal systems have enduring utility to farmers, and that formal systems should not aim for universal coverage. Informal systems can be good for seed access – desired varieties, appropriate times, and affordable terms – and can be good at maintaining (and even enforcing) seed quality. Additionally, market-based activities in the informal seed system meet wider rural development agendas. But informal systems are also not flawless: they can benefit from supply of new germplasm, better links between seed production and demand, and (appropriate) improvement to storage and seed quality. Both systems have strengths and shortcomings on their own, but integration of the two can build on complementarities, and thus improve the impact, cost-efficiency, and resilience of the entire national system. Thus, there are rational reasons to limit the scale of the formal system, and also support the informal system, provided there are clear linkages between the two. The figure below, considering seed systems broadly (including breeding and gene banks) indicates some areas of linkage. Section 4 of this Appendix will discuss in more detail activities that can link these systems in TL.

The proposed Seed Industry Structure (Fig 1 in Main Report) presents Sol III's integration in TL in a different format, showing how support to informal systems is more broad-based than for formal. Achieving widespread and sustained adoption only from formal system outputs would be unjustifiably expensive for TL, and go well beyond its current production and management capacities - this would be the case in nearly all other Southern countries. Therefore, a design which balances formal and informal systems, using defined quantities of formal seed to leverage wider impact through the informal system, is most appropriate for a low-income country like TL.

[1] Other terms are less satisfactory, and risk diminishing the potential of informal systems: 'farmer', 'traditional', or 'local' seed systems do not acknowledge how local systems may involve many actors (including traders), can incorporate innovations and improved varieties, and may operate at different scales.
[2] See Cooper (1993) or Sperling *et al.* (2008).. Informal systems tend to be even more dominant in LDCs.

2. PRESENT SITUATION

This section briefly outlines current crop development, seed production and seed system management activities in TL.

2.1. Selection of new crop varieties

Before SoL, there was no systematic crop research in TL. Only two older maize varieties, developed in Indonesia, were widely grown, along with local varieties for most other crops. SoL I and II have made great progress in assessing and releasing new varieties with improved yield potential for TL. The activities to do this are described in detail in recent reviews of SoL II, and are only briefly reviewed here. SoL helped establish – or rehabilitate – research centres and stations in Betano, Loes, and Aileu, and has used other testing sites for replicated trials. Germplasm assessment practices, and related training to national staff, are well-developed. Through building relationships with international breeding programs (generally CGIAR centers and selected national programs), SoL has obtained many lines for testing across major food crops. It has assessed lines through yield trials (and more recently, other agronomic trials) on four different stations, with promising lines taken to On-Farm Demonstration Trials (OFDTs), which are under farmer management, across hundreds of sites a year. Varieties that are acceptable to farmers, have good yield potential, and which perform well across a range of environments are considered for release. Since 2001, 9 varieties of 5 crops (maize, lowland rice, peanuts, sweet potato and cassava) have been released, with 8 varieties still promoted. Other lines for these crops are in the pipeline for possible future release and research has expanded to new crops, including wheat and legumes, and to aspects of agronomy and farming systems management – for instance, trials on timing, fertilizer response, or the use of velvet bean (*Mucuna*) for weed-control.

Capacity for testing and screening is limited to a small number of lines for any given crop. For instance, in 2008, 20 maize, 20 rice, 11 peanut, 11 sweet potato, and 24 cassava varieties were assessed in replicated yield trials. Research facilities have been used very efficiently to do this, particularly the small station in Aileu. However, the effectiveness of this depends on receiving well-targeted germplasm from international programs (particularly the CGIAR network). Thus, good relationships with these programs remain essential, so that SoL continues to receive lines that are likely to meet needs in TL.

Comparisons with breeding in Indonesia give a sense of how advanced SoL's work is. Indonesia's national program released 66 maize varieties (19 of them OPVs) between 1980 and 2000, with annual yield gains often over 3% during this period, achieving a mean yield nationally of 2.5 t/ha in 2000. SoL has released 2 maize varieties in its first nine years – though of course TL is much smaller. The best OFDTs in TL achieved 2.5 t/ha with *Sele* in 2008. Indonesia released 29 lowland rice varieties between 1980 and 2000, while SoL has only released *Nakroma* so far. Mean rice yield in Indonesia was 4.4 t/ha. OFDTs in TL achieved 4.8 t/ha with *Nakroma* in 2008. Actual yields of SoL varieties are likely to be somewhat lower at full plot scale, or in poorer years than 2008. However, this still suggests that SoL work is reasonably well-advanced in terms of yield potential of its varieties. Further yield gains are certainly possible, but gains from any future releases will likely be much lower than the 30-80% yield gains seen in the first generation of SoL releases – though even modest yield increases may still be valuable for farmers. Moving away from yield, future SoL varieties may well address additional concerns, such as stress tolerance, ease of processing, or storage ability. The number of varieties released is low compared to elsewhere in the region, and SoL should seek to release more varieties of key

foodcrops to improve the range of choice – and adaptation to specific locations – for farmers. Continued variety development is also necessary to address changing conditions arising from disease, socio-economic shifts (e.g. in labour or markets), or environmental change.

Finally, there are other important foodcrops that have not received any improvement work in TL. Legumes, particularly climbing beans, could potentially make important contributions to food security and farming systems, while highland areas have high concentrations of poverty, and have received little research. Thus, there is a strong case for expanding work to new crops, such as legumes and highland cereals.

2.2. Seed production

SoL helped in establishing a Variety Release Committee in the GoTL in March 2007. However, prior to the 2008 MTR, SoL was not involved in seed production, and any onward distribution of seed came largely via OFDTs and farmer-farmer exchange, as the informal system was largely non-commercial. Starting in 2008, a Seed Production Advisor was appointed to co-ordinate seed production, and SoL supported seven Seed Production Officers (SPOs) through MAF, working in six districts: Aileu, Baucau (2), Bobonaro, Liquica, Manufahi, and Viqueque. Training of these SPOs in seed production, handling, storage and processing is ongoing.

Formal seed production commenced in 2008/09. Foundation seed is mainly produced on the Betano station for most seed crops, and for cassava. The production of formal seed – for dissemination to farmers and other users – largely comes from this foundation seed, though the best sweet potato site (on-farm, in the Districts) is selected each season as the source for the next year's cuttings, and is maintained in the off-season. Equally, some cassava plants, once established, may be used in some cases for continued production of canes. So the labelling of specific generations of seed (i.e. formal seed classes) is less relevant for vegetative crops.

Production of formal seed works through contract farmers, who are identified by SPOs to enter into a contract with MAF. Seed growers may be individuals or groups. Criteria for their selection include: good potential of land for the crop grown, secure land tenure, sufficient land area (growers or groups with 3 ha or more preferred), proximity to infrastructure, ability to allocate labour to seed production, an interest in learning, and a progressive attitude. Good water supply is also valued, particularly for sweet potato contract growers.

SoL II has not used a demand approach to set production targets, but rather organised production around its human resources, setting each SPO a quota of 5 ha per seed crop (maize, rice, peanuts). Contracted growers are visited well before the start of the season, and regularly thereafter – often weekly. The SPOs assess production sites and their history (e.g. isolation distances, previous tuber cultivation), and offer advice on management of genetic and phyto-sanitary purity, and support for processing. In 2009, formal seed was harvested from 28 ha of rice, 24 ha maize, and 15 ha peanuts. Contract growers receive inputs (foundation seed) for free, and the loan of tarps for drying. Once processed and sorted, SoL purchases all of their harvest (less a small amount for personal use) at guaranteed prices, well above market rates for grain ($0.50/ kg for maize and rice; $0.75 for peanuts – based on clean seed). For sweet potatoes, only a single production site per district has been established – five in total in 2008 – with a total area of 0.3 ha nationally. Cuttings are harvested at more than one time per season, and these growers are paid a monthly fee (currently $50) for their efforts, rather than on a per cutting basis. Seed crops are taken back to Seed Processing Centres (SPCs), where they exist, for further processing and storage, while sweet potato cuttings are distributed directly in nearby areas, mostly via *suco* Extension Officers (SEOs). Cassava varieties have only recently been approved for release, and so far are being

multiplied on station in Loes and Bobonaro. For 2009, clean seed production was approximately 60 Mt rice, 20 Mt maize, and 18 Mt peanuts, with just under 100,000 sweet potato cuttings distributed (see attachment 1).[3]

There have been some attempts at working through 3rd parties to produce formal seed – mainly via bilateral projects. This has not been greatly successful to date, mainly because SPOs have not been involved in the process. In particular, 3rd parties who have attempted to work with a large number of farmers at once have found it difficult to achieve good quality seed production at that scale, as it was hard to offer guidance to ensure quality standards are met to so many at once. Also, 3rd parties who supplied free inputs (such as tractors) found that farmers treated those plots as 'extra' rather than 'core' production, so management tended to be poor. In general, the volume and quality of formal seed from such 'arm's length' arrangements has been disappointing.

There are as yet no formal quality control standards (though the Draft Seed Law will move toward establishing regulatory system and standards). SPOs monitor quality, largely through regular visits throughout season, visual checks for purity at harvest, moisture tests, and germination tests conducted at the SPCs.

2.3. Seed distribution

Distribution of formal seed has been largely through MAF District offices, NGOs, and bilateral programs, as well as indirectly through SoL's own use of seed for OFDTs and seed growers (see Attachment 1). FAO emergency programs were the predominant users of *Nakroma* rice seed in 2009. NGOs pay for their seed, unless they use less than 200 kg[4]. Distribution via MAF channels to farmers in districts is free of charge. Requests for seed from Districts and SEOs largely reflect existing relationships with SoL and SPOs, and the level of awareness of SoL varieties. Major distributions are signed off by the NDA&H in an individual capacity, so are not necessarily linked to any wider strategy. Formal seed distribution approaches vary considerably in their effectiveness at ensuring farmers are able to make good use of the seed and retain it for the following year. CARE, for instance, gives extensive support to farmer groups, and has helped these groups scale-up production from small initial supplies of formal seed – in some cases selling seed beyond the group. Some other organisations, particularly FAO's distribution, has not been well-targeted toward those actually short of seed. Finally, many OFDT farmers retain some of the small amount of formal seed tested on their farms, and roughly a third have distributed this on to others. As awareness grows about SoL varieties, so is the evidence of high demand, which to date is not being satisfied.

2.4. Seed storage

Storage and conditioning facilities vary considerably. While most SPCs have some storage silos, and all have moisture testers, the only well-equipped Centres are at Baucau and Betano, which have warehouses, seed cleaning and drying equipment, and facilities to seal bags. Other SPCs lack processing equipment, and generally have sub-standard storage facilities. Aileu has no storage capacity at all, while the warehouse in Viqueque is at best a temporary measure. Other than the Baucau warehouse, others have not been purpose-built for seed storage, and have issues of temperature control, access, and security – all of which can affect the quality of seed, or ease

[3] Reports refer to different time-frames, or vary in their accounting for losses due to processing, so individual SoL reports may give slightly different figures from these.
[4] R. Williams, *pers comm..;* this threshold given as 20kg in 2009 Annual Report.

of storage. Farmer seed growers producers have no additional seed storage facilities beyond their own on-farm facilities and practices.

2.5. Extension-support for seed production

Skills of the SPOs are increasing through training and experience. They provide good levels of support to contract seed growers, which is one of their main tasks during growing season. SoL also provides training to 3rd party groups on seed production. There may be opportunities to develop a stronger link with district and subdistrict extension specialists to provide additional extension support to seed producers outside of SoL's contracted formal production.

2.6. Seed system management

Overall management of the formal seed system has improved greatly under SoL, and is focusing on improving quality standards. However, the wider MAF agenda for expansion of production, and strategies for distribution of formal seed appear somewhat *ad hoc* and reactive. There is not a clear message on the value and scarcity of seed produced from the formal system, which might drive more critical engagement with 3rd parties who wish to multiply or distribute formal seed. MAF has expressed a desire to expand formal seed production significantly, but the costs of this are not considered, nor is the potential of other, less expensive informal channels of production and dissemination.

There is a clear desire from MAF for a rapid evolution of the formal seed system towards the situation seen in much more developed countries (e.g. as in SE Asia), which have strong regulatory regimes, expensive facilities, and a diversity of public and private actors involved in production and distribution. However, this does not reflect the current stage of development of agriculture or of markets in TL (which is closer to SS Africa); evidence from elsewhere indicates that rapid evolution does not occur in such contexts. Moreover, the greatly expanded formal seed system envisioned by MAF would require strategic management capacity and a policy framework (currently lacking), and divert already-scarce skilled MAF personnel from other duties.

For a largely subsistent and significantly food-insecure sector, as exists in TL, increasing access to improved varieties is most important, followed by reasonable standards of seed quality. Thus, rather than rapid expansion of formal seed production, it makes more sense for formal seed production to be limited in scope and scale and linked with informal seed production and distribution systems, maximising access to improved varieties for farmers at minimum cost. There needs to be clear limits to the scale of formal seed production, so sufficient emphasis can be placed on other, informal sector approaches to increasing access to good quality seed.

3. ISSUES AND CONSTRAINTS

Major issues and constraints include:

- There are as yet no improved varieties for legumes, or temperate zone crops (wheat, barley, potatoes), developed specifically for TL. These crops are potentially important for addressing food security and poverty.
- Though there has been a significant increase in formal seed production and capacity, the quantities of formal seed produced under SoL II remain limited. In particular, sweet potato distributions are very locally concentrated, and cassava distribution has not yet started. Additionally, there is considerable variation in formal seed production between

areas and growers – particularly for maize – which makes it difficult to predict supplies in advance.

- Concerns persist about the genetic purity of maize foundation seed, and about the phyto-sanitary quality of vegetative crops used for seed production. More generally, foundation seed production is mostly in one location, and does not have dedicated staff who can concentrate on producing top-quality seed.
- Most SPOs are currently stretched across multiple varieties. There is limited scope for expanding production from each SPO (e.g. through increased number of contracts per SPO) without re-organising their approaches.
- SPCs vary considerably in their capacity for quality control and storage. In particular, high temperatures at some of the warehouses are a potential risk to seed viability over time. Increasing seed production volumes, combined with the range of crops and varieties that will potentially be distributed, will stretch current capacity to manage supply, quality, and distribution.
- Strategic oversight for coordinating requests for formal seed with supply, targeting priority farmers, and improving production from this seed, is lacking. As a result, distributions tend to reflect individual decisions, rather than a plan, and can go to groups that do not use formal seed effectively. The scale-up benefits from this seed are not being maximised. Impacts of formal seed distribution through third parties (such as NGOs and other donor programs) are rarely assessed, but appear to be highly variable. There is little emphasis on cost-recovery in this area.
- MAF's long-term vision of the formal seed system is too elaborate for TL's current level of development, and will do little to address priority needs of its farmers. Plans to increase dramatically the scale of formal seed production and the number of SPCs lack assurances for maintaining quality or sustaining operational capacities, and do not appear to be driven by a sound rationale of meeting farmers' priority needs.
- Farmers' own seed systems are still poorly-understood. There is very limited knowledge about why and how farmers use seed sources across different crops, contexts, and social groups. This hampers the effective use of informal channels for seed production and dissemination, and limits understanding of wider impact.
- Farmer awareness of new varieties remains limited at national scale[5], particularly around the potential performance of different varieties (a growing issue as more varieties become available), sources of seed for these varieties, and related crop management. Awareness within MAF or NGOs is also variable.
- SoL III's plans to work through both formal and informal seed systems for production and dissemination has great potential to increase impacts, not just in food security but also for economic development. Developing capacity for seed production and distribution through informal channels will represent a very new direction for SoL and MAF, and may be perceived as high-risk or dubious by some. Efforts to support informal seed systems generally come via NGOs, rather than Agriculture Ministries. Support the informal system from within the formal research system may raise tensions, as both systems operate differently. This will need careful management.
- More generally, for seed in TL, market demand is weak, with little evidence of proactive purchase. Sweet potato cuttings are given freely in small amounts; rice seed is not traded for cash and is absent from markets, there is no evidence of price margins for (potential) peanut seed. Only with improved maize seed is there evidence of a price margin above grain at sowing time, but the volume of market demand – apart from NGO buyers – appears to be small to date.

[5] With considerable variation between SoL and non-SoL districts.

- Produce markets also appear to be thin for SoL crops. Market traders either sell their own (or neighbours') produce, or sell produce brought to them by farmers that day, with little evidence of independent storage capacity or of proactive procurement from production areas. This limits the scope for traders building supply relationships for (potential) seed. However, some traders have more permanent premises, though tend to sell much more than just food.
- The draft seed policy risks restricting the scope for developing new market channels by imposing strict licensing or labelling requirements on traders. Equally, this may draw away limited MAF personnel to develop a regulatory system for a barely-developed sector.
- Seed storage losses are high, with very few farmers having access to appropriate storage facilities. Challenges of storing seed – or maintaining vegetative crops through the dry season – limit the scope of farmers to increase seed supply through informal channels, whatever the mechanism.

4. PROPOSED STRATEGY FOR SoL III

The **goal** of the Program is 'Improved food security through increased productivity of major foodcrops', with the **objective**: 'Farmers have access to and are routinely using improved foodcrop varieties'.

End-of-Program outcomes (EoPOs) at objective level are set in terms of adoption rates – i.e. the proportion of farmers who routinely use SoL varieties. These differ by crop, reflecting each crop's number of growers, geographical spread, ease of production and distribution, and the level of progress in formal seed production from SoL II. EoPOs are that SoL varieties will be used by:

- 46,000 (70%) lowland rice farmers.
- 61,000 (40%) upland farmers. Within this:
    - 40% of maize growers are using SoL varieties;
    - 70% of peanut growers are using SoL varieties;
    - 50% of sweet potato growers are using SoL varieties; and
    - 20% of cassava growers are using SoL varieties.

These expected adoption rates are based on the scale and scope of formal and informal seed production activities set out below. The Program builds on the achievements of SoL I and II, namely variety evaluation and formal seed production. SoL III will have four Components, which include the two main previous areas, but also expand work to informal seed production and distribution, and to overall seed system management. These four components build on each other in a logical manner (see Strategic Framework outline and discussion in Main Report).

- **Component 1 – Evaluation of Improved Foodcrop Varieties --** continues the work started by SoL I. This is the 'engine room' of the entire seed system, and must continue in order to address new challenges and opportunities.

- **Component 2 – Formal Seed Production and Distribution –** develops the formal seed system**,** which SoL II initiated. Formal-sector production, quality-control procedures, and supply channels are also key aspects of a seed system. Components 1 and 2 both produce essential public goods, with little scope for private-sector involvement in breeding or seed supply for open-pollinated staple foodcrops – especially considering TL's level of

development.[6] Thus, both Components 1 and 2 will need to be within the public sector and supported by MAF for the foreseeable future.

- **Component 3 – Informal Seed Production and Distribution –** strengthens informal channels for producing SoL seed, and its distribution to farmers. This will involve multiple strategies to increase farmers' access to SoL varieties, and build the foundation for more demand-driven market channels for seed production and distribution to develop in the informal sector. This component is new for SoL III, and will use outputs from Components 1 and 2.

- **Component 4 – Seed System Management** – builds MAF's capacity to strategically manage the overall seed system. This will involve establishing planning and monitoring systems, promotional activities, policy engagement, and cross-cutting strategies for addressing gender and environmental concerns. This Component, also new to SoL III, will orient all SoL III work to meet the EoPOs. For instance, seed system management needs to establish and maintain an appropriate balance between formal and informal activities (Components 2 and 3), so that there is sufficient formal seed to introduce new varieties rapidly, but not so much that it stifles the development of informal channels, or undermines the longer-term sustainability of SoL's work.

The key outputs and activities for each component are described below.

4.1. Component 1: Evaluation of Improved Foodcrop Varieties

The 'engine room' of SoL has been established for nine years. Variety selection and release work must continue, as new varieties are regularly needed to continue increasing productivity, to address new challenges (e.g. biotic and abiotic stress), and exploit new opportunities – which include new crops and growing regions. Additionally, data gathered from stations and OFDTs are invaluable for understanding how environmental conditions and management practices affect productivity, which is essential for developing appropriate technical advice, and for assessing risks due to environmental change. This component functions very efficiently, and the balance of activities between on-station and OFDT testing appears broadly appropriate.

End-of-Program outcomes for Component 1 include:

- National network of Research Centres and smaller Research Stations established, sufficient to cover major crop types and agroecological zones.
- 10-15 new varieties of foodcrops evaluated and officially released by end of SoL III
- Research staff competently managing all phases of the research cycle, including objective setting, planning and implementation of trials, analysis, and reporting.

4.1.1. National Agricultural Research Centres and Stations established

Presently, two larger Research Centres (Betano and Loes), one smaller Research Station (Aileu) are established, which need no further investment, apart from establishing irrigation at Loes.

[6] Private-sector involvement in breeding and seed-supply generally occurs only in much more developed contexts, where: there is a critical mass of market-oriented farmers; well-established institutions and support networks for breeding, input-supply and regulation, intellectual property protection; and significant volumes of seed marketed through formally-licensed dealers. Private investment also tends to be confined to F_1 hybrids (Pray & Umali-Deininger, 1998; Tripp & Pal, 2001; Cromwell,.1996). None of these conditions applies to TL or to SoL crops.

However, there is a strong case for extending work to new crops, particularly food legumes and Irish potatoes, as well as highland cereals, because of the potential impacts on food security and poverty (especially acute in the highlands). This requires the establishment of three Research Stations: i) Darasula (Baucau) for mid-altitude red acid soils, ii) a high-elevation site (possibly in Ainaro) for temperate crop evaluation, and iii) a lowland irrigated site (possibly in Baucau or Bobonaro) for rice variety evaluation. MAF will cover salary costs for the additional personnel needed to run this station network.

4.1.2. Genetic material of potential improved varieties identified and sourced

Most focus to-date has been on maize, rice, and peanuts, with sweet potato and cassava receiving slightly less attention. SoL III will place more emphasis on the latter two crops, as well as expand to new crops: food legumes, and temperate crops such as wheat, barley, and potatoes. Adaptation and farming systems trials will also increase in importance under Sol III. As screening lines carries high opportunity costs for SoL, it is important that pre-screening takes place to identify candidate lines that have the best chance of performing in TL. Lines for testing will still be sourced from international centres (mostly CGIAR centres, but also select national programs such as Indonesia for food legumes, Thailand for cassava or maize, Philippines for rice, or Australia for temperate cereals). To ensure that pre-screening is effective in identifying useful lines, SoL III will support visits to TL by relevant staff from these international centres, to assess national needs and evaluate their lines' performance.

4.1.3. Potential new varieties evaluated on-farm

On Farm Demonstration Trials (OFDTs) continue to be essential for identifying successful SoL varieties, as they assess performance under farmers' conditions and management, gauge farmer acceptance of different varieties, and help promote new varieties. Over 800 OFDTs are run every year across seven districts, involving 15 OFDT Officers. The overall scale and geographical focus will not change, but as new crops are added for testing, the number of OFDTs per crop will likely reduce, and workload of the OFDT staff will need to be managed. Two OFDT Coordinators will be appointed as new positions to help manage these activities. Also, Component 2 will support SEOs to become more involved in the implementation of OFDTs as part of broadening efforts to distribute seed and increase farmers' awareness and skills around SoL varieties.

SoL and MAF, in conjunction with the Variety Release Committee, will continue to define screening criteria that relate to priority needs, particularly yield potential, as well as quality traits that interest users. However, for crops where users other than farmers are important – for instance, merchants or food processors for soybeans – other groups may also need to be involved in assessing candidate lines. While nutritional value might also be useful to consider in screening, many factors affect individuals' nutritional status. The nutrient content of a given variety or crop should not override other selection criteria that also affect well-being, such as productivity, yield stability, ease of processing, etc.

4.1.4. Selected new varieties officially released.

This will work through the existing Variety Release Committee, using both on-station and OFDT data to support applications for release.

4.1.5. Sufficient foundation seed being produced

Foundation seed production will expand from Betano to Loes Research Centre, once irrigation facilities have been established. This will help spread production risk across two sites, and will easily ensure enough foundation seed is produced for Component 2.

It has been suggested that on-station seed production could also have a generation *prior* to foundation seed, which would be produced in small amounts under enhanced quality control procedures. While this has advantages for ensuring maintenance of a pure basis to formal production, it would also likely add to the complexity and cost of management. This may need further review during implementation, though there does appear to be a case for an additional generation to maintain a pure line of *Sele* maize to support subsequent foundation seed production. For *Sele*, high outcrossing rates, and the scarcity of sources for re-stocking from outside TL, may justify additional effort at maintaining pure seed stocks.

4.1.6. Capacity of MAF staff to manage the identification and release of new varieties strengthened.

Continued training will be offered to research station and OFDT staff. SoL II's approaches will continue to receive support: long-term postgraduate study abroad; shorter-term (up to 2 months) placements abroad for practical training; and short courses within TL on topics such as breeding, agronomy, soils, and statistics, as well as on English Language. Increasingly, TL staff will be called upon to draft reports and conduct research work independently, with the objective that they will be competent at managing all phases of the research cycle, from planning, to implementation, analysis, and reporting.

4.2. Component 2: Formal Seed Production and Distribution

The **objective** of this component is**:** Sufficient high quality seed being produced through formal channels to maintain the genetic quality of released varieties

EoPOs for Component 2 include:

- Four Seed Processing Centres established (2 new) for receiving, storing, grading, drying and packaging formal seed, with a combined capacity of approximately 175 MT per annum.
- Production and effective distribution of 100 MT of formal maize seed, 50 MT of rice seed, 25 MT of peanut seed, 600,000 sweet potato cuttings, and 600,000 cassava canes per annum[7].
- Seed production staff competently managing the production and processing of targeted quantities of formal seed; and extension staff competently managing the distribution of this seed to farmers.

4.2.1. Formal seed being produced through farmer contracts

In its two years of formal seed production through contract farmers, SoL II has increased volumes produced, and has started to focus on improving the quality (genetic, phyto-sanitary and bio-physical) of formal production (see Attachment 1). Seed production in 2009/10 was roughly 60 Mt for rice, 20 Mt for maize, 18 Mt for peanuts, and a few tens of thousands of sweet potato and

[7] Additional formal seed production targets will be specified as other improved species and varieties are released.

cassava cuttings/canes. Though there is an understandable desire to increase substantially the quantities of formal seed produced, the case for doing so is not compelling. Firstly, formal seed production is expensive and demands scarce SoL/MAF resources. Additionally, there are trade-offs between increasing the scale of production on one hand, and the ability to ensure quality of production on the other – limited by equipment, facilities, and staff capacity to manage these processes. Finally, formal production needs to supply enough formal seed to drive onward dissemination, but not so large that it stifles informal (particularly market-oriented) channels, which are less expensive but can potentially reach more farmers. So limits to seed produced from this Component need to be set.

Appendix 9 (Financial and Economic Analysis) presents an analysis using the best available data on numbers of households and household areas to SoL crops. It models household adoption rates, on the assumption that distributions to households will be 5 kg for rice, maize and peanuts, and 100 canes/cuttings for sweet potatoes/cassava[8]. Using conservative assumptions about adoption/dis-adoption rates, onward dissemination to other farmers, replacement rates for seed stocks, and a seed reserve, this model shows that annual formal seed production of **50 Mt rice, 100 Mt maize, 25 Mt peanuts, and 600,000 stems/cuttings of cassava and sweet potato** would be rational targets for formal seed production in TL. This would enable the majority of peanut and rice farmers, half of maize and sweet potato farmers, and a third of cassava farmers to adopt SoL varieties by year 5 (see the Appendix 9 for more detailed explanation). These figures make many assumptions – not least on the efficiency of distributions and targeting – but illustrate the point that formal production need not be significantly larger than at present, with the exception of maize.

The present system of using SPOs to select and support contract farmers works well, and should continue, with SoL continuing to finance seed purchase from contract farmers, or pay monthly fees for land and labour from sweet potato growers. As national production targets are approached, maximum quantities to purchase can be set for individual growers. This would allow contract growers who exceed this quota to sell seed outside of contract arrangement (via Component 3), should they wish to do so. Contract growers who wish to sell additional seed this way would be supported by Component 4's mechanisms that link (informal) seed suppliers to buyers.

There is a case for concentrating production in a limited number of areas, reflecting regional variations in demand, production potential, and efficiencies of scale in processing. Baucau and Bobonaro for rice, and Baucau for peanuts, are likely candidates for this. For maize, serious consideration should be given to shifting production from low-yielding upland areas where current production is based, to better quality irrigated land in lowland areas where higher yields are possible – or to produce seed in areas with access to supplemental irrigation, as the current yield of formal maize seed producers (1 Mt/ha) is well below potential, and limits possibilities for scaling-up maize production. Concentrating production in fewer areas, intensifying maize seed production, and appointing more SPOs through MAF, will allow SPOs to be used more efficiently and effectively, as presently individual SPOs spend much of the season managing contracts for all major crops across a district.

With sweet potato and cassava, ideally there should be more decentralised production sites, given the perishability of these crops, and to spread risk from disease or loss. Thus, the current contracting mechanism will be expanded, with SoL supporting 30x0.05 ha sites for sweet potato

[8] Note that seed purchased by farmers in Component 3 may be come in smaller packets, as farmers buying seed in markets or seed fairs often prefer to try out smaller quantities.

production, and 15x1 ha sites for cassava, located in all districts. In addition to the above species, the Program will also support formal seed production activities for other species and varieties as they are released during the course of SoL III.

4.2.2. Quality assurance systems established

Quality assurance systems underpinning formal seed crop production are well-established, carried out by SPOs. These processes include close inspection of seed growers' field and crop management, rogueing, monitoring of harvest and seed selection practices, and routine assessment of moisture levels, and germination tests. Assessing germination percentage provides a reasonably robust check on quality for seed crops, and is appropriate for a system at this level of development. Other aspects of quality control include managing seed lots, inventory control, and labelling. These systems will not change greatly, and SPOs will continue to receive training in these activities on an on-going basis.

For vegetative crops (sweet potato and cassava), controlling for phyto-sanitary quality will remain more difficult, as this requires careful field inspection to identify pathogens load, remains more difficult. In the absence of pathology testing or insect-free greenhouses, this will continue to depend on careful field inspection, and on recording previous land-use at production sites. Only the very best production sites should be used to re-supply foundation seed (i.e. cuttings and canes) to contract growers the following season.

For all crop types, maintenance of genetic purity is assisted by the visual distinctiveness of most current SoL varieties – i.e. *Sele's* colour, *Utamua's* grain size yellow maize. However, if new varieties are released that are similar to existing ones, more careful protocols may be needed to limit contamination of formal seed stocks.

4.2.3. Technical extension support provided to contracted seed growers

Contract growers receive little extension support apart from that provided by SPOs, which mainly focuses on seed production practices – e.g. plot preparation, seed selection, conditioning, and storage. Under SoL III, efforts will be made to establish a stronger linkage with district and sub-district extension staff. Provision is also made for exposure visits by key seed producers within TL and to Indonesia.

4.2.4. Seed grading, packing and storage facilities established

Only two fully-equipped and operational SOCs have been established under SoL II – in Baucau (Triloca) and Manufahi (Betano). While there are limited MAF facilities in other districts, these lack equipment or warehouses designed for seed storage. SoL III will support an additional two SPCs, located in districts where seed production activities are to be concentrated. Each Centre will include storage for approximately 60 Mt of seed, drying floors and batch drying facilities, seed cleaning facilities and packing facilities. The centres will be purpose-built to ensure low storage temperatures, good access, and security. Sufficient storage silos will be provided for all four Centres to be able to store the projected maximum production target of 175 Mt for seed crops. Where possible, larger silos than the current 1 and 2 Mt silos could help use warehouse space more effectively.

4.2.5. Formal seed distributed through preferred distribution channels

Seed distribution is controlled by MAF at the national level, and is currently based on a 'first come first served' basis without any prior strategic planning. The main distribution channels are through MAF direct to farmers, and through intermediary NGOs and other bilateral donor programs. Maximising access to and use of SoL seed is a key Program objective, but will require better management of the distribution process. This is needed to reach areas relatively unexposed to SoL seed (which will entail moving seed from production areas and SPCs to areas of need), and developing links that integrate formal and informal production channels. Prior planning, and ongoing reflection, is needed to define which channels are preferred, so that (expensive) formal seed is put to best use. Providing seed for the Program's internal needs (e.g. for OFDTs), and for the community seed production groups (CSPGs) established under Component 3, should take priority over all other users.

Distribution to third-parties (NGOs and other development programs) should be subject to clear 'rules of engagement' for third-party recipients of seed. These should include the need for timely requests; clear and workable plans for the distribution of SoL seed; agreement on the minimum quantity distributed to each farmer (which should be sufficient to plant a realistic area); plans for assuring access to seed for vulnerable groups; an established track-record in agriculture and good knowledge of TL farming systems; farmer engagement that is not tied to free inputs or otherwise breed dependency; and a commitment to monitoring the uptake and impact of their distributions.

The main distribution channel will be through MAF, either to Community Seed Production Groups (CSPGs, Component 3), or directly to farmers outside of CPSGs. This will work through the existing extension system, which has established staff at districts, sub-district and *suco* level. Provision is made for the Program to support the transport of seed from the SPCs and sweet potato and cassava production nurseries to secure storage facilities located at the District Extension Centres being developed by MAF; and from the District Extension Centres to distribution points within sub-districts. SEOs will be responsible for final distribution to farmers.

GoTL requests presently come via SEOs and other officials familiar with SoL seed. As awareness grows, there will need to be more attention given to coordinating demand with available supply (see Component 4). The NDACD will be responsible for planning the logistics of distribution.

All distributions to non-GoTL organisations should be on a cost-recovery basis. While acknowledging the difficulty of selling seed to farmers in the current climate where government (and development agencies) provide, and farmers expect, free handouts, the Program should progressively move towards at least partial cost-recovery from farmer clients in the longer term.

4.2.6. Capacity of MAF staff to manage the production and distribution of formal seed strengthened

Capacity-building activities in Component 2 will focus on SPOs, who are responsible for supervising the production and processing of formal seed; and towards extension staff (at all levels) responsible for managing seed distribution activities. Three general types of training will be supported, as in Component 1: (i) long-term post-graduate study abroad; (ii) shorter-term (up to 2 month) on-the-job training at seed production/ processing sites within TL and Indonesia; and (iii) a range of short courses of up to 1 week in duration in topics including field management of seed crops, quality assurance systems, assessing and controlling seed quality (both genetic and phyto-sanitary), storage management, equipment O&M, breeding systems, and seed planning and

inventory management. The core objective of all training is to improve the performance of SPOs to the point where they can competently manage all aspects of certified seed production and processing; and extension staff to the point where they can competently plan and manage the logistics of seed distribution.

4.3. Component 3: Informal Seed Production and Distribution

The **objective** of this component is to strengthen mechanisms for the production and distribution of seed through informal and market channels.

This component will support informal seed channels, to complement the strengths of the formal system (Component 2). Improving farmer access remains the objective, but this Component will also develop a range of initiatives to encourage the development or market-based seed channels in the informal system, something that is as yet barely present in TL. These activities will be implemented on a pilot basis, and will therefore require particularly close monitoring to assess outcomes, providing a basis for possible future scale-up. The approaches outlined are inter-locking, as some will support others (e.g. linking farmer production groups with marketing).

The potential for developing market-based approaches for vegetatively propagated species is much lower than for seed-based varieties. The central role of tubers and root crops in food security also indicates a strong public-good argument for continued investment in non-market approaches for these species.

EoPOs of Component 3 include:

- About 1,000 CSPGs established and producing a marketable surplus of informal seed.
- CSPGs linked with market outlets and selling seed.
- Mechanisms for strengthening market-based exchange of informal seed implemented, evaluated, and where appropriate replicated.

4.3.1. Community seed production groups

Establishing and developing CSPGs will be a key activity in this Component, as a means of increasing the volumes of informal seed produced and diversifying production sites, both of which can help widen access to SoL seed. Initially, established groups will increase seed access and seed security of their own members, but eventually they should be able to supply other farmers, in some cases beyond the immediate locality. Additionally, CARE's experience with seed groups shows that seed groups may be able to generate sales of seed as well.

Under SoL III, CSPGs will be established in rural districts where CARE is not already working (Bobonaro, Liquica and Ermera), with a target of over 1,000 groups established by the end of the Program. A typical CSPG will comprise 10-15 farmers, self-selected, and will receive 2 years of intensive support. Support will include a package of inputs and training, including seed, seed storage, production and processing advice, tarpaulins for drying, basic hand-tools and equipment including labour-saving devices such as maize shellers, and facilitation of links to potential buyers and to other services. Groups will be specialised on a particular variety, with an initial focus on maize, rice and peanuts. The criteria for group establishment should be similar to those for contract seed growers: secure access to land, and an interest in self-reliant production (rather than seeing the group as a means of acquiring other inputs, such as tractors). Potential access to irrigation or pumps would also be an asset for sweet potato production.

Where possible, pre-existing groups of households that already have strong (informal) collaborative links will be utilised, for instance around labour exchange. Such groups appear to be common in rural TL, particularly among closely-related households living near each other. The formation of women-only groups will be actively promoted and facilitated. Additionally, groups with existing market-oriented activities should also be sought out. Youth groups supported by GTZ and the Youth Employment Program are obvious candidates.

Drawing from CARE's experience, it is expected that CSPGs will start slowly, providing small quantities of seed so that group members can become familiar with seed management (and multiply enough for themselves) in the first season, with a view to expansion to surplus seed production in subsequent seasons.

4.3.2. Farmer seed marketing groups established

Farmer seed marketing groups (FSMGs) are organisations that cluster together several CSPGs as a way of facilitating their marketing of seed and scope of activities. This activity is modelled on similar initiatives from CARE's work in Bobonaro and Liquiça. This is likely to bring together only the more successful CSPGs, provided they are close enough to each other (ideally, within easy access of each other – CARE's groups, for example, tend to be within the same *suco*, or even *aldea*). Contracted formal seed producers that are able to produce seed surplus to their contracts could also provide a basis for forming a FSMG. The advantages of these groups are to increase producers' scope for trade, expand their capacity for storage, provide them with an institutional presence to engage better with local planning and government, and be a channel for regular receipt of formal seed from Component 2.

Establishment and initial viability will involve provision of infrastructure and some resource inputs – e.g. for storage. While support and training for organisational and enterprise development would also be useful, as would credit provision, microfinance is beyond the scope of SoL III. The Program may be able to facilitate links to other providers, including GoTL, or AusAID's Market Development Facility. The longer-term viability of the FSMGs will depend on delivering tangible advantages to members (i.e. profitable sales), and possibly on their ability to provide other services to their members and communities, such as serving as a local grain bank. Support to help these groups tap into demand for seed, and other produce, will be important, and come through the activities described in 4.3.5 below. Regular supply of new varieties to such groups can be a good way of ensuring sustained income.[9]

The Program will initially support, as a pilot, the establishment of up to 6 FSMGs in total, covering maize, rice and peanuts. The groups will be located where the density of CSPGs is highest, and should not be established until after member CSPGs are well-established and producing a surplus– i.e. after 2-3 seasons. Establishment of the FSMGs will be directly supported by Program TA as a pilot activity.

4.3.3. Support to focal merchants

Though market infrastructure and activity is thin in TL, many farmers do acquire seed from the market, and merchants are potentially a key channel for dissemination of SoL varieties. Local

[9] There is a wealth of information to help guide establishing farmer marketing groups. One of the best sources is CIAT http://webapp.ciat.cgiar.org/agroempresas/ingles/index.htm ; http://webapp.ciat.cgiar.org/africa/pdf/eri_guide2/contents.pdf , http://webapp.ciat.cgiar.org/africa/pdf/farmer_seed_enterprises.pdf

seed/grain merchants could be an important link between locally-based CSPGs, and seed from the formal system[10]. The Program will support, as a pilot, the strengthening of a single 'focal merchant' in each main district market. Criteria for selecting these merchants will include: having a permanent base in the market; regular trade at that market through the season; a good reputation with buyers, access to secure storage at that market; access to transport; and (where possible) existing supply links to areas where CSPGs and FSMGs are being established.

The program will support focal merchants to access new varieties, with the eventual aim of establishing links, and possibly contracts, with CSPGs and FSMGs. Focal merchants will also receive business development support and advice, as well as training around the management of these varieties, and around essential aspects of maintaining seed quality (i.e. separate storage, good storage conditions, key aspects of seed quality such as germination). Seed storage containers will be provided if required, as well as simple promotional materials to help these merchants market this seed on to farmers. Additional material support, such as credit, may be important, though how this is provided, and by whom, needs careful consideration.[11] Other channels for support could emerge from AusAID's Market Development Facility, or via RDP's efforts in TL to promote value chains (though likely to be with soybeans and mungbeans in near-term). Linked to this is promotional work to raise farmers' awareness of SoL varieties, as well as the higher quality of seed these merchants offer. Strengthening of focal merchants will be directly supported by Program TA as a pilot activity.

4.3.4. Access to seed for vulnerable groups improved, e.g. through vouchers and seed fairs

Seed vouchers and fairs are increasingly used in post-disaster situations to improve access to seed for seed-insecure farmers and monetise seed producers (Remington *et al.*, 2002)[12]. Potential benefits include: giving farmers choice over which varieties (and quantities) they can obtain; creating market linkages; increasing awareness among all participants of the crops and varieties farmers use (both SoL and local ones); supporting CSPGs and FSMGs with a ready outlet for seed; and possibly encouraging merchants to become more involved in trading seed. Vouchers are distributed to (selected) farmers in advance of the fair, allowing them to purchase what they want during the day of the fair.

As improving access is the primary output, careful targeting of voucher recipients will be needed. Seed fairs should be piloted in selected areas with concentrations of vulnerable farmers – i.e. those who might otherwise find it difficult to purchase seed. This may best be achieved through collaborating with established programs that have already identified and work with vulnerable food-insecure households, as it would be costly – and possibly contentious – for SoL to identify beneficiaries itself. CSPGs and FSMGs, and focal merchants could be invited to participate.

[10] See http://webapp.ciat.cgiar.org/africa/pdf/seed_pb6.pdf and http://www.uea.ac.uk/dev/faculty/McGuire/Understanding+and+strengthening+informal+seed+markets for deeper discussion here.

[11] Credit provision is a common constraint to small scale dealers, and some projects have offered support here. For a Ugandan case, see http://www.springerlink.com/content/k227571333397407/

[12] Catholic Relief Services has pioneered Seed Vouchers and Fairs, and are a good source of experience and guidelines here – see *Seed Vouchers and Fairs: A Manual for Seed-based Agricultural Recovery in Africa* by CRS in collaboration with Overseas Development Institute and International Crops Research Institute for the Semi-Arid Tropics. For readily available guides, see http://www.appropedia.org/Seed_fairs_(Practical_Action_Technical_Brief) and http://pdf.usaid.gov/pdf_docs/PNADG037.pdf,. and for critical reviews of this work, see http://www.odihpn.org/report.asp?id=2726

Wider participation could be through nation-wide advertisements seeking EOIs from vendors who do not specialise in seed or grain, but who nevertheless are able to source seed to sell at the fairs. CARE used this approach for emergency seed vouchers and fairs interventions in 2003/04, with good results.

Participating vendors will need sufficient advance notice, some indication of which crops and varieties might be in demand, guidance about the seed quality expected, and – where possible – links to CSPGs and FSMGs with surplus to sell. They should also be aware of the number of vouchers provided in an individual fair, to have a sense of potential sales. The scale of operations should be defined carefully, to balance the size of fairs (large enough to be worthwhile for traders) with the distance farmers need travel. As a rule, each participating household receives the same value of vouchers, in small denominations to maximise flexibility. Prices may or may not be set in advance, though fixed prices are one way to encourage merchants to attend. Quality of seed on offer can be evaluated prior to, and during, the fair, by farmers or SoL staff, or both. As farmer choice is a key goal, seed on sale should not be restricted only to SoL varieties: monitoring of sales allows a robust check of demand for SoL varieties over others.

The experience of CARE in 2003/04 suggests that it is useful to run these fairs more than once, to build up traders' knowledge and capacity to market seed. Also, developing experience and market links during a non-crisis period can be helpful, as these channels can then be used if there is a crisis intervention – rather than divert seed stock from Component 2 for emergency distributions, as has happened in the recent past.

The Program will support 4 seed fairs in selected areas with concentrations of seed-insecure farmers, directly supported by Program TA as a pilot activity.

4.3.5. Mechanisms linking suppliers to buyers enhanced

Low or unpredictable local demand for seed is often a major constraint for local seed enterprise development. The Program will support a set of activities intended to improve the flow of information on potential seed suppliers, and areas of demand, to facilitate trade. This will entail: (i) gathering information on surplus production from CSPGs and FSMGs; (ii) gathering information about potential demand for seed, from projects, local NGOs, and SEOs, etc.; (iii) collating and managing this information at a higher level; and (iv) facilitating links between buyers and potential sellers. This activity will be directly supported by Program TA as a pilot activity in selected districts.

Suppliers' planning will benefit from advance notice, and a key challenge will be to encourage timely requests. A second challenge will be to move beyond institutional buyers (projects, NGOs, etc.), but also be able to link suppliers with individual farmers who wish to buy SoL seed. Assistance to FSMGs and focal merchants to publicise their activities may also help stimulate demand among individual farmers, though information on surplus seed sources should also be conveyed to extension officers (at all levels), so they can inform interested farmers of where they can find SoL seed.

4.4. Component 4: Seed system management

The **objective** of Component 4 is to strengthen MAF's capacity to manage the national seed system. This will balance formal (Component 2) and informal (Component 3) seed production and supply, and link to on-going improved variety evaluation work (Component 1). Higher-level management capacity is necessary not only to efficiently plan and manage seed supply to farmers,

but also to ensure that cross-cutting issues (gender, environmental change, and policy engagement) are addressed across the Program.

EoPOs for Component 4 include:

- National seed planning, allocation and inventory control systems established.
- M&E/ SOSEK unit competently managing the implementation of field evaluation activities, providing a sufficient basis for progressive learning.
- Policy issues identified and advice provided on key issues related to development of the national seed system.
- Gender issues fully reflected in implementation of the national seed system.
- Widespread awareness of SoL varieties in all districts.
- Improved varieties and farming systems being identified taking into consideration projected climate change impacts.

4.4.1.Seed planning and management systems established

At present there is little concept of systematic planning and management of a national seed system encompassing formal and informal components, resulting in a high opportunity cost related to use of high-value formal seed in a sub-optimal manner, and failure to capitalise on the benefits (and reduced cost) of producing informal seed through the informal system. The current focus is limited to producing more formal seed, and the distribution of this seed in a relatively unplanned, *ad hoc* manner. Effective management of the national seed system – both formal and informal – needs to be able to identify strategic priorities for seed distribution, and have systems that direct and manage flows of seed from both components in a way that maximises access and impact.

On the supply side, this requires production planning, contract management and inventory control for formal seed, as well as managing information on informal seed production, particularly from CSPGs. On the demand side, effective management requires collation of requests for seed, the definition of priority users and areas for receiving seed, and the ability to distribute seed in relation to a wider plan. Finally, effective management systems will need to reflect on the impact of different delivery mechanisms, particularly in terms of access and seed quality, to enable the program to identify which approaches and delivery channels will be most effective for which contexts.

The Program will support the development of systems to address the above, with particular emphasis on forward planning capacity, allocation procedures, and development of a simple inventory management system

4.4.2.M&E/SOSEK processes strengthened

Developing M&E capacity that can provide a foundation for progressive learning will be essential to informing the on-going development of a comprehensive national seed system for TL. M&E should not be an afterthought, but rather an integral part of each major activity carried out. The SOSEK team, established under SoL II, has undertaken some highly relevant work to date, but the scope of work will need to be considerably broadened under SoL III.

At a general level, the national seed system needs to be guided by a much richer understanding of the informal seed system[13]. This would help to analyse the impacts of different activities on seed access, for instance, by having better estimates of the extent of farmer-farmer seed exchange for a given crop. Better appreciation of the diverse ways that farmers manage their own seed and variety security is essential in order to understand the opportunities – and risks – different interventions may present. This needs to extend beyond listing seed sources and look at farmers' actual practices in detail.

The work of the M&E/ SOSEK team also needs to be broadened to evaluate the results of specific Program interventions as they unfold. These investigations should be planned as an integral part of each major activity implemented. Some examples include: (i) details of demand for formal and informal seed, including from whom, amounts sought, and reasons for demand; (ii) effectiveness of different delivery mechanisms in terms of access and seed quality; (iii) awareness among farmers of SoL seed, its management needs, and where it can be found; (iv) contribution that CSPGs make to widening access to and spread of SoL seed; (v) quality of seed produced by CSPGs; (vi) factors contributing to the success of CSPGs; (vii) impact of seed production on livelihood diversification; (viii) effectiveness of different approaches to improved variety promotion; (ix) how vulnerable groups, including women, gain access to seed; (x) volumes and prices of seed sold by focal merchants, and comparisons with other market prices for grain; and (xi) results achieved from the proposed pilot use of MAF financial systems for disbursing funds directly to the district extension services. Given the nature of the Program most of these studies will involve targeted field investigations and case studies using key informants.

The SOSEK team will be expanded under SoL III with two additional staff members.

4.4.3. GoTL seed policy being informed by SoL experience

Capitalising on its central position in the national seed system and its strong field presence, there is a prime opportunity for the Program to influence seed-related policy. This requires identification of policy issues; analysis of evidence based on field experience; and reporting to relevant government officials. Some areas where SoL III could play a role include: (i) finalisation of the draft seed law, particularly in terms of regulation of quality and permission to trade; (ii) MAF strategies for seed purchase and distribution; (iii) MAF strategies for input provision, particularly targeting and terms; (iv) emergency seed relief policies; (v) procurement policy regarding direct purchase of seed from farmers; and (vi) MAF budget allocations to support the various components of a national seed system.

4.4.4. Seed system gender strategy implemented

Refer to Appendix 3 for further detail.

4.4.5. Improved variety technical and promotional materials developed

SoL is already effectively utilising a range of high quality technical and promotional materials, including brochures, posters, calendars, banners and t-shirts. Additional materials will be developed as new varieties are developed and new activities are initiated. In future, some materials may be tailored to specific audiences – e.g. farmers or focal merchants.

[13] This was also stressed in the Office for Development Effectiveness report (March 2010) to the Design Team.

4.4.6. Awareness of improved varieties enhanced

A key challenge will be awareness of varieties in order to simulate seed demand. This is a challenge even in contexts where there are established seed enterprises with their own marketing activities (such as with maize in East and Southern Africa[14]), and is even more so for informally produced and supplied seed. While in the short-term, the distinctiveness of SoL sweet potato (large roots), maize (yellow grain), and peanut varieties (large seeds) will help with promotion and awareness, farmer awareness of SoL varieties will be a growing issue as new varieties are released. The Program will develop a promotional strategy to raise awareness of SoL varieties, making use of mass media, particularly radio and television, but also ICT approaches such as text messaging.[15]

4.4.7. Environmental and climate change impacts addressed

SoL II has recently commenced work assessing the likely impacts of climate change on food crop production in TL. Under SoL III this assessment will be continued and applied to help inform the selection of species/ varieties that are better adapted to projected changes in climate. It will also provide a basis for identifying possible adaptations to farming systems (e.g. use of velvet bean as a cover crop and identification of farming systems that are based on a more diverse range of crop types). Multi-year OFDT yield data will be correlated with local climate data providing a field-based assessment of the actual impacts of climate change for different species/ varieties, providing a possible basis for crop yield and food security projections.

4.4.8. Capacity of MAF staff to manage the national seed system enhanced.

Provision is made for targeted training of national MAF staff as an integral part of developing the above systems. Provision is also made for exposure visits by senior staff to review the structure and operation of seed systems in other countries such as Australia and Indonesia.

4.5. Phasing

The 3 additional Research Stations under Component 1 will be established during the first 3 years of the Program. Production of formal seed under Component 2 will reach targeted annual volumes by the end of PY1 for peanuts, sweet potato and cassava; end of PY2 for rice; and end of PY4 for maize. The additional 2 SPCs will be established in PY1 and 2. Establishing the CSPGs under Component 3 will start in PY2 and continue through to PY5, reflecting seasonality and the need for this activity to occur after the ramp-up of formal seed production. Other activities under Component 3 designed to stimulate market-based seed exchange will be implemented from PY2 on.

[14] See Langyintuo (2010) for a recent review.

[15] Resources abound to help guide the use of media, and other ICTs, in knowledge-transfer. See http://www.ks-cgiar.org/ , http://ictkm.cgiar.org/index.php, http://www.e-agriculture.org/ , http://iaald.blogspot.com/, and http://www.researchintouse.com/index.php?section=1, among many others, offer resources and links to experiences in this area.

5. IMPLEMENTATION

5.1. Investment costs

The Program will fund the following investment costs:

- Establishment of 3 new research stations (i) at Darasula (Baucau District) for evaluation of varieties at mid-altitude on red acid soils; (ii) at a high altitude site (probably in Ainaro District) for evaluation of temperate crops; and (iii) in an irrigated rice growing area (probably in Bobonaro or Baucau District) for evaluation of rice varieties.
- Development of irrigation facilities at the Loes Research Centre.
- Establishment of 30 x 0.05 ha sites for sweet potato and 15 x 1 ha sites for cassava, located in all districts.
- Establishment of an additional 2 SPCs, including basic seed lab facilities, located in districts where seed production activities will be concentrated.
- Establishment of a potato storage facility at an appropriate location.
- Upgrading of secure storage facilities in selected districts (if suitable facilities are not available at the network of District Extension Centres currently being developed by MAF).
- Basic seed storage, tarpaulins, hand-tools and equipment including labour-saving devices such as maize shellers, for up to 1,000 CSPGs.
- Infrastructure (e.g. a small office) and some basic storage and equipment for pilot establishment of 6 FSMGs.
- Basic storage for focal merchants in district markets.
- Computer hardware, software and basic office equipment related to developing capacity to manage the national seed system.

5.2. Training

The Program will fund a broad range of training activities in relevant subjects, including but not limited to:

- Training of Research Centre/Station staff and OFDT staff in subjects such as statistics, plant breeding, agronomy, soils, and English language, designed to develop competency across all phases of the research cycle including objective setting, planning and implementation of trials, analysis, and reporting.
- Training of SPOs in topics including field management of seed crops, assessing and controlling seed quality (both genetic and phyto-sanitary), storage management, equipment O&M, breeding systems, and seed planning and inventory management.
- Training of contract seedgrowers and cassava and sweet potato nursery operators on production methodologies.
- Training of extension staff at district, sub-district and *suco* levels on seed handling, and the benefits and use of improved varieties.
- Training of farmers receiving formal seed, aimed at improving farmer awareness of improved varieties and ensuring that distributed seed is used in the most effective manner.
- Training of MAF extension staff (district, subdistrict and *suco* levels) in topics including group establishment, group dynamics, gender and monitoring, related to their role in supporting the establishment of the CSPGs.
- Training of the CSPGs in group operation and basic production methodolgies, conducted.

- Training of FSMGs on organisational and enterprise development.
- Training of focal seed merchants in district markets on the management of improved varieties and the essential aspects of maintaining seed quality.
- Training of national MAF staff to develop their capacity to plan, coordinate and monitor a national seed system that is based on inter-linked formal and informal seed production and distribution activities..

Training needs and activities are further detailed in Appendix 2. A range of training approaches will be utilised for professional staff development, including: (i) short courses of up to 1 week in duration; (ii) on-the-job placements at appropriate institutions outside of TL for periods of up to 2 months; (iii) exposure visits to review the operation of various components of a national seed system in other countries; and (iv) a limited number of post-graduate studies in Australia or Indonesia.

5.3. Operational support

The Program will provide operational support in the following key areas:

- Contribution to the operating costs of the Research Centres/ Stations, excluding professional staff costs.
- Sourcing and import of germplasm of potential new varieties for evaluation.
- Conduct of OFDTs.
- Purchase of up to 100 Mt of formal maize seed, 50 Mt of rice seed, and 25 Mt of peanut seed per annum from contract seedgrowers.
- Purchase of formal seed of other varieties yet to be released up to specified maximum quantities (to be determined).
- Contribution to the operating costs of 4 SPCs, excluding professional staff costs.
- Operating costs of 30 x 0.05 ha sweet potato nurseries and 15 x 1 ha cassava nurseries, located in all districts.
- Transport of formal seed and planting material from SPCs/ nurseries to subdistricts for on-distribution by SEOs to farmers.
- Provision of a small operating budget to district, subdistrict and *suco* extension staff to support their role in relation the distribution of formal seed to farmers, implementation of field demonstrations and monitoring activities, and establishment of CSPGs.
- Miscellaneous operating costs associated with the FSMG, focal seed merchant, and seed fair pilot activities included under Component 3.
- Miscellaneous operating costs associated with developing capacity and processes/ systems at national level underpinning development of a national seed system.

5.4. GoTL staffing

Present and proposed GoTL professional staffing of SoL is summarised in the following table:

	Positions		
	Existing	**Additional**	**Total**
Research staff – Component 1			
On-Station Research Officers (OSRO)	7	4	11
OFDT Coordinators (OFDTC)	2	2	4
OFDT Officers (OFDTO)	17	0	17
Pure Seed Officers (PSO)	1	2	3
Seed production staff – Component 2			
Seed Production Coordinators (SPC)	1	0	1
Seed Production Officers (SPO)	7	5	12
C-B seed production staff – Component 3			
C-B Seed Production Coordinators (CBSPC)	0	9	9
Program management – Component 4			
National Program Manager (NPD)	0	1	1
M&E/ SOSEK Staff[16]	2	2	4
Regional Coordinators (RC)	0	3	3
Gender Coordinator (GC)	0	1	1
Training Coordinator (TC)	0	1	1
Total GoTL positions	**37**	**30**	**67**

The 37 professional GoTL staff under SoL II are engaged full-time on SoL activities, and represent a considerable commitment by GoTL to SoL[17]. Around 30 additional full-time staff will be required to scale up to a national program, mainly associated with the expansion of research activities under Component 1 and their linkage with Component 2; the expansion of formal seed production and processing activities under Component 2; oversight of informal seed production activities under Component 3; and the provision of additional management support at national level. These staff will be seconded from existing positions within MAF, and will be fully funded by MAF from the commencement of Phase III. Most of the positions will be based full-time in relevant operating units in the districts (e.g. Research Centres and Stations, Seed Processing Centres, and Extension Departments), and will report through their respective directorates to the NPD. Brief (1 page) position descriptions will be developed for all national counterparts during startup, in consultation with MAF. Note that in addition to the above full-time positions, there will be substantial involvement from extension staff at all levels for distribution of formal seed to farmers (under Component 2) and informal seed production activities (under Component 3).

The 12 SPOs will be located in the 4 districts where production activities are to be concentrated. Utilisation of existing district-level NDA&H staff to support sweet potato and cassava production activities in districts where other seed production activities are *not* being supported will be pursued. Additionally, stronger linkages with district and sub-district extension specialists will be pursued to assist SPOs in supporting contract seed growers with extension information and support to seed production.

5.5. TA requirements

Proposed long-term TA positions at national level include a Research Adviser (responsible for supporting implementation of Component 1); a Formal Seed Production Adviser (responsible for

[16] Including a specialist Gender Research Officer.
[17] 32 of these positions are currently funded by GoTL.

supporting Component 2); and an Informal Seed Production Adviser (responsible for supporting Component 3). The first 2 of these positions are a continuation of support already being provided under SoL II[18]; the third is a new position reflecting the particular skills that will be required for the development of informal seed production and distribution activities. In addition to guiding the implementation of their respective components, these advisers will directly support the implementation of relevant Component 4 activities, together with the M&E/ SOSEK Adviser, the Gender Adviser and the Climate Change Adviser. Provision is also made for 3 Regional Advisers who will work at district level across all components.

All LT TA positions will be permanently counter-parted with designated MAF staff, reflected in the GoTL staffing outlined in the previous section.

In addition to the LT TA positions, ongoing short-term inputs from technical specialists will be required in areas such as:

- Informal seed system analysis. This is to support the SOSEK team in designing a range of qualitative and quantitative approaches to analyse aspects of the informal seed system, to enable better assessment of the impact of SoL III's work. Efforts will focus on seed access channels, and farmers' practices in accessing seed and managing its quality.
- Farmer agro-enterprise development, with expertise in the establishment and operation of CSPGs and FSPGs.
- Using media in crop technology promotion.
- Gender, with farming systems or seed intervention expertise, to assist with finalisation and implementation of a gender strategy.

Table 1.1 – Formal Seed production of main seed crops in 2008 and 2009, in MT (Source: 2009 Annual Report)

District	**CROP**					
	Rice *(Nakroma)*		**Maize (*Sele*)**		**Peanuts (*Utamua*)**	
	2008	**2009**	**2008**	**2009**	**2008**	**2009**
Aileu	0	4.2	0	1.8	4.8	0
Baucau	5.1	29.0	0	1.4	0	9.5
Bobonaro	0	6.4	0	4.6	0	2.8
Liquica	0	10.9	0	0.6	0	0.8
Manufahi	0	3.8	0	15.1	0	1.7
Viqueque	3.8	8.5	14.8	1.4	0	2.9
TOTAL	**8.9**	**62.8**	**14.8**	**24.9**	**4.8**	**17.3**

Table 1.2 – Formal seed distribution in 2009, by recipient, in MT. National seed needs based on SoL's own estimates of crop areas and sowing rates.

Recipient	**CROP**		
	Rice *(Nakroma)*	**Maize (*Sele*)**	**Peanuts (*Utamua*)**
MAF & FAO	36.1 (84%)	7.1 (38%)	3.8 (25%)
MAF-SoL	2.9 (7%)	3.2 (17%)	5.9 (39%)
NGOs	3.9 (9%)	8.5 (45%)	5.2 (35%)
TOTAL	42.9	18.9	14.9
% national seed need reached	**5%**	**1%**	**15 %**

[18] The SoL II Team Leader has also fulfilled the role of Research Adviser.

APPENDIX 2

INSTITUTIONAL ASSESSMENT

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5.6. Terms of Reference

This appendix is based on the institutional assessment completed as part of the design process for Seeds of Life Phase III (SoL III). The overall terms of reference for the design mission are detailed in Appendix 11. The specific terms of reference for the institutional assessment were extracted from Appendix 11 and are summarized as:

Sustainability and Institutional Strengthening. Institutional capacity is a key constraint (and risk) and therefore the design needs to stress the importance of program sustainability – and therefore a strong institutional focus will be critical. Undertake an institutional assessment of capacity needs of the specific areas of the Ministry of Agriculture and Fisheries (MAF) related to SoL III and develop a capacity building strategy for SoL III which covers: (i) the nature (type) of institutional support to be provided; (ii) the means by which progress will be measured; and (iii) a realistic time-line (transition strategy) for the gradual hand-over of activities to MAF during SoL III.

Government Systems. The design will examine the viability of using MAF systems, specifically the possibility of using Government of Timor Leste (GoTL)/MAF public financial management systems (including the viability of budget support) as well as MAF's agricultural extension systems. Assess prospects for at least part of Australia's financial contribution to SoL III to be channelled directly through MAF, including the conditions needed to enable such support and prospects for these conditions to be met over the next five years; and assess the need for Australian technical assistance or advisory support to enable MAF to meet these conditions.

5.7. Appendix Format

This appendix firstly provides background information on Timor-Leste's agricultural sector which is directly relevant to the design of SoL III. The appendix then focuses on an organizational overview of MAF which covers institutional structures and staffing. The next two sections discuss MAF's strategic planning framework and related support programs through other donors. The main constraints and issues which might impact on SoL III are then discussed and this is followed by an assessment of the design implications for SoL III. The final section outlines a capacity building strategy for SoL III in terms of the support needed to ensure that SoL III can be implemented effectively and sustainably, and move towards the establishment of a national seeds system embedded within MAF.

6. Background

6.1. Policy Environment

6.1.1. Overview

Timor Leste is an insular country with an area of 15,000 square kilometres and approximately 1.1 million inhabitants[19]. Its separation from Indonesia in 1999 was accompanied by violence which left a large part of the country's public and private infrastructure in ruin, one third of the population displaced, and a severe shortage of human resources and institutional capacity. Following intervention by a multi-lateral peace-keeping force the country was ran until its independence in 2002 by the United Nations Transitional Administration in East Timor (UNTAET) which was established with supreme executive, judicial and legislative authority, and proceeded to rebuild essential infrastructure and to set up the foundation of a Timorese administration. After independence, the country's stability was disrupted several times by riots and demonstrations, the most recent in 2006 when concern about food shortages caused major civil disruption. Presidential and legislative elections were held in 2007

[19] Source: 2004 National Census – with population figures inflated.

and a new Government (IVth Constitutional Government) is currently running the country.

According to the 2006 Human Development Indexes, Timor Leste ranks 142nd and is among the world's 10 poorest countries in spite of its increasing oil revenues. Between 2001 and 2006, Timor Leste's non-oil GDP per capita decreased from $450, (half of that of Rwanda) to $343, and in 2007 more than 40% of the total population was living below a national poverty line of $0.88 a day.

6.1.2.The rural sector

Timor Leste is predominantly an agrarian country. The majority of the population rely on agriculture which provides employment for 80% of the active population, and more than 90% of the value of non-oil exports. Although Timor Leste's topographic features makes much of the country less than ideal for agriculture, the rural sector is the Nation's most important economic sector because the majority of the population derive their livelihood directly or indirectly from agricultural activities. The sector accounts for about 30% of non-oil GDP (excluding UN expenditure).

Vulnerability to adverse weather events (erratic rainfalls, cyclonic winds, etc.) low public and private investment, widespread reliance on traditional technology, and impediments arising from agrarian structures continue to constrain this important sector. However with appropriate policies and support programs the rural sector could play a much greater role in improving living standards and contributing significantly to economic development.

Progress has been made in establishing the sector's legal and regulatory framework. Laws and regulations for all sub-sectors have been enacted, rules approved, institutions created and annual development programs prepared. The biggest challenge faced by MAF is capacity; in terms delivering services to its rural constituents, financial resources, infrastructure and qualified human resources, and power of enforcement of existing laws and regulations. MAF is aware of these shortcomings and efforts have commenced to strengthen the capacity of the institution and its staff. Success in strengthening institutional capacity, delivering support services, program coordination, and monitoring and evaluation will determine the outcomes from MAF's current and future rural development programs.

As Timor-Leste's rural economy is almost completely dominated by agriculture, slow growth in the sector explains the slow development of non-farm activities in rural areas. If the situation in rural areas is to improve, agricultural growth has to accelerate and reach a higher and more stable level. Annual agricultural growth will have to reach at least 5% before there will be positive results in terms of poverty reduction over a sustained period.

6.1.3.Infrastructure and support services

Agricultural productivity in Timor-Leste will not be improved in the shorter-term without (as a minimum) the provision of: (i) a nation-wide agricultural extension system; (ii) adaptive research programs for all major products; (iii) input supply and distribution systems; and (iv) food and product storage facilities. These essential inputs and services must be supported through the provision of improved rural roads.

In the longer-term and once the issue of rural hunger and has been addressed, the sector will need additional support in the form of: (ii) formation of farmers' groups; (iii) private sector participation where surpluses are available and suitable for value-adding; (iv) improved marketing practices and market outlets; (v) agro-processing equipment, product storage facilities and agro-industries/ agribusiness; (vi) abattoirs and fish collection points, and (vii) provision of agricultural credit.

6.1.4.Fragility

Following its long struggle for independence Timor-Leste is currently in a post-conflict situation with the prevailing stability deemed to be fragile but improving rapidly. Whilst the IVth Constitutional Government is under-taking concerted and admirable efforts towards establishing sustained stability (with support from the international community) time will be required to consolidate the progress achieved and ensure the long-term State viability. During this period of insecurity when government institutions are in the process of being developed and there are severe constraints in terms of a skilled labour force and availability of goods/services, flexible and innovative program designs and delivery mechanisms will need to be adopted.

Timor-Leste's Development Partners (DPs) have recognised the need for new modes of intervention which combine traditional development cooperation with other instruments, and have embarked on discussions aimed at arriving at joint policy choices which are appropriate to countries in fragile situations. Timor-Leste is a pilot country for The World Bank and the European Commission to analyse the relationships between instability, institutions and development, and to formulate coherent policies on how best to address security threats and challenges posed by the on-going State-building processes.

6.1.5.Key development challenges

Agriculture and livestock production provide 80% of all self-employment and account for 30% of non-oil GDP. About 40% of all households rely on subsistence agriculture alone and face food insecurity issues every year. While MAF ranks food security as the country's first priority, crop (food and cash) and livestock production is the only sector of the economy other than petroleum which can generate substantial economic growth and therefore contribute to sustainable poverty reduction and reduced unemployment. In addition, because of the high capital and operational costs of new and rehabilitated irrigation schemes, major and sustainable improvements in food security will only result from the allocation of increased resources to the upland (rainfed) areas which produce the bulk of food supplies (and the main cash crop – coffee) but which remain the poorest in the country.

The largest and most urgent development challenge in Timor-Leste is to increase food production/ food security and to improve living conditions in rural areas. In 2007 an estimated 49.9% of the total population were subsisting below the basic needs poverty line. The biggest challenge faced by the sector is how to increase production of the main staple crops. Food insecurity, including food shortages, affects the most vulnerable section of society – remote and upland farming households. In the longer-term, increasing agricultural production and productivity will also need to be linked to increasing on- and off-farm employment opportunities. Once surpluses are available there will be opportunities to develop national (and possibly international) markets for local products, and through value-adding. This will reduce reliance on food imports[20].

Timor-Leste' agricultural environment is degrading rapidly and therefore the immediate challenge is the development and extension of farming systems which are based on conservation agriculture techniques. There are a number of such systems which are proven in similar socio-economic conditions, such as incorporation of legumes into cereal cropping systems and retention of organic matter on the soil surface. Promotion of systems which involve fundamental changes to current production practices (for example rainfed terraces and water collection systems) should be avoided at least until the poorer sections of rural society are self-sufficient in basic foodstuffs. These farming families are very risk averse and will not be receptive to change until their major issue has been resolved – regularly supplies of adequate food.

Current cereal processing and storage systems in Timor-Leste result in huge grain losses. Rice milling is very inefficient (50% recovery instead of about 60%) and up to 30% of annual maize production is

[20] About 110,000 Mt of rice in 2009.

destroyed by weevils because of poor quality storage systems. However there are simple solutions to these issues (more efficient rice mills and maize storage drums) and such interventions should be included in all agricultural support programs.

Limited rural development planning and coordination capacity, lack of clear priorities, and over-lapping institutional arrangements have resulted in uncoordinated interventions by development agencies and some unnecessary duplication. The challenge is to strengthen MAF's capacity for development and operational planning and coordination across all institutions which participate in and support Timor-Leste's rural sector.

6.1.6. Institutional context

Three ministries are in charge of rural development in Timor-Leste and until recently (when the European Commission [EC] assisted the Ministry of Economy [MED] to prepare an overall Rural Development Framework [RDF]) this situation lead to inefficiency and over-laps[21]. It is now accepted that MAF is responsible for overall 'conception, execution, co-ordination and evaluation of the policy defined and approved by the Council of Ministers in relation to agriculture, arboriculture, and fisheries'. More specifically, the ministry is in charge of all technical aspects of agricultural development and accordingly has three Secretaries of State responsible for agriculture-arboriculture, fisheries, and livestock.

More broadly, the Ministry of Infrastructure (more specifically the Secretary of State for Public Works) is responsible for the construction and maintenance of all infrastructure, including roads and irrigation. The same Ministry is also responsible for power, water and sanitation. MED and more specifically the Secretary of State for Rural Development is responsible for private sector support, co-operatives and micro-finance in the rural areas. MED is also responsible for reforestation and the environment, at least according to Timor-Leste's organic law.

6.2. Legal Basis

The organisation, services and responsibilities of MAF are determined by Decree Laws[22]. MAF was created by Decree-Law No. 7/2007 of 5 September 2007, on the Organisation of the IV Constitutional Government. Article 30 provides for the definition, through an organisational law, of the terms under which MAF is responsible for designing, executing, coordinating and evaluating the policies approved by the Council of Ministers for the areas of agriculture, forestry, livestock and fisheries. The Decree-Law No.18/2008, of 09 June 2008 establishes MAF's organisational structure (components and services) and defines its respective competencies. This decree/law enables the decentralisation of operational interventions to district offices (13) and lower levels of government. The structure provides MAF with the necessary means to increase equity, efficiency and efficacy of its services, in order to attain the objective of food security and generate national economic growth.

The mission of MAF is to develop, execute, coordinate, and assess the policies (defined and approved by the Council of Ministers) for the agricultural sector, specifically in the fields of agricultural research and technical assistance to farmers, irrigation systems, management of forestry, livestock production, and fishery resources. MAF's powers are listed on page 6 of 'MAF – Overview of Policies and National Directorates – their Resources, Activities and Plans for 2009'.

[21] MAF is now responsible for Axis 1 in the RDF – see "A Strategic Framework for Rural Development in Timor-Leste (2010 – 2020), Ministry of Economy and Development, A. Sendall primary author.
[22] Sections 6.2 to 6.5 are based on 'MAF – Overview of Policies and National Directorates – their Resources, Activities and Plans for 2009'.

6.3. National Strategic Development Plan

In April 2010, when launching the Nation's Strategic Development Plan (SDP), the Prime Minister of Timor-Leste announced that 'there are at least three strategic sectors for economic growth in the coming two decades: agriculture, petroleum and tourism' and that 'each of these requires a public investment program'. The Prime Minister's focus on agriculture is highlighted by the following partial extracts from the SDP:

The agriculture sector employs around two-thirds of the economically active population ……..…….. The sector is remarkably promising, but in the past has underperformed. There is enormous potential in several areas: staple crops,……. Traditionally, Timor-Leste relied on low-input, subsistence methods……. The problem has been the lack of improved inputs…., reflected in the level of poverty of smallholder farm households……Timor-Leste is now ripe for a Timor Green Revolution, in which the government works with smallholder farmers to increase the use of inputs through…….. modern technologies and the benefits of cutting-edge research.

When the design for Sol III is considered against the Prime Minister's objectives for Timor-Leste's rural sector, it is quite apparent that the Program complies with and supports the strategy outlined for the next 5 – 10 years. There is pointed reference to the importance of staple crops and the need for cutting edge research, and the impact of low food crop yields on people's standard of living. SoL III is designed to address these key issues and provide support programs which are a prerequisite if Timor-Leste's is to become food self-sufficient and increase farmers' incomes.

6.4. MAF's Policies

The 2002 National Development Plan (NDP)[23] laid down the vision for the agricultural, forestry and fisheries sub-sectors: 'to have by 2020 sustainable, competitive and prosperous agricultural, forestry and fisheries industries that support improved living standards for the nation's people.' The key development indicators for the agricultural sector in the NDP, and which are relevant to SoL III, included:

- Increased food production (the most critical indicator, measured as overall amount of food produced and food production per household), rural incomes, per capita nutritional intakes and increased area (hectares) planted to new crop varieties;
- Higher proportion of irrigated land relative to total arable land and higher crop yields and productivity; and
- Higher income and employment among farmers and increased foreign exchange earnings from exports of quality agricultural and fisheries products.

The 'Ministry of Agriculture, Forestry and Fisheries Policy and Strategic Framework' (2004) was, and still is, the general guiding policy document for the development of the sector. After analysing potential, trends and constraints of the different sectors and sub-sectors, the policy document spells out objectives and corresponding implementation strategies for the ministry to contribute to the previous National Development Plan. The overall policy objectives were:

- Improve the level of food security of the rural population and raise self–reliance.
- Increase value-adding of agriculture, forestry and fisheries products by fostering output processing and marketing.
- Achieve sustainable production and management of natural resources.

[23] The Prime Minister recently released a new Strategic Development Plan for Timor-Leste and a summary was presented at the annual donor coordination meetings in April 2010.

- Contribute to the balance of trade by earning revenue from commodity exports and by substituting imports.
- Increase income and employment in rural areas.

The following general guiding principles are spelt out in the policy:

- Secure availability of sufficient and affordable food.
- Enhance the capacities of rural communities for self-reliance.
- Deliver essential services to rural communities together with the private sector and non-governmental organisations.
- Enable and facilitate agricultural and natural resource development.
- Create an enabling environment for rural producers and the private sector, and keep direct involvement to a minimum with a focus on public good type of services.
- Introduce cost-recovery mechanisms over time where private benefits occur.
- Strengthen the integration between agriculture, livestock and natural resource management in rural planning.
- Use participatory processes when working with communities.
- Cater for the specific needs of women, children and disadvantaged groups.
- Build in environmental sustainability as a genuine element in all programs.
- Protect designated habitats and species.

Since the launching of the Policy and Strategic Framework (2004), sub-sector policies have been developed by MAF for forestry, fisheries, food security, and quarantine. Policies for livestock production, agricultural extension and agro-chemicals are in the last stages of drafting. This Policy and Strategic Framework has recently been revised as part of the new Prime Minister's SDP, but specific details on MAF's responsibilities are not yet available.

6.5. Political Objectives (for agriculture)

The 4th Constitutional Government Program (9th September 2007) spells out the following broad objectives for the development of Timor-Leste's agricultural sub-sector over a four year period[24]:

Agriculture is the main economic activity in East-Timor. It is mainly subsistence agriculture, employing family labour with low productivity in a fragile natural environment. Therefore the broad objectives for developing the sub-sector are to:

- Move from subsistence level to market agriculture.
- Change from small production to regional product specialization.
- Improve irrigation infrastructure to assure production, thus stimulating, in an irreversible way, agriculture development.
- Reduce regional discrepancies through the rehabilitation of rural extension centres and roads, and the stimulation of markets.

GoTL intends to promote human resource development, diversification of production, adequate national legislation, commercialisation, increase production and productivity, extend production in abandoned areas, subsidise inputs, promote organic fertiliser, promote farmer organisations, support food processing, create food reserves, facilitate micro-credit, promote soil and water conservation, promote technical crops, and improve rural infrastructure.

6.6. Priority Areas and Focus

National Priorities (NPs) were established by the 4th Constitutional Government in 2008 and 2009, and

[24] Includes minor edits by the design team.

this process is expected to continue until the SDP is operationalized. NPs 1 and 2 for 2009[25] focused directly on agricultural development and included:

- NP 1: Food Security: Increased domestic food production, and improved food security monitoring and response. Responsible government entities: MAF; Ministry of Tourism, Commerce and Industry (MTCI); and Ministry of Social Solidarity.
    - Rationale: subsistence farming continues to be the main source of employment and income for the vast majority of the population. Agricultural productivity is low and needs to be boosted. Successful efforts to increase production and improve food security were taken under the 2008 NP program and should be continued and expanded.

MAF had three initiatives which focused on this food self-sufficiency objective. Firstly, 27% of the Ministry's 2009 budget ($9.0 million, excluding DPs' support programs) was allocated to irrigated rice in the form of investments in communal and large-scale irrigation schemes (green-fields and rehabilitation). This included $4.8 million for the large Uatolari irrigation scheme. In addition JICA assisted with two major irrigation projects: (i) Irrigation and Rice Cultivation Project in Manatuto – total budget of $2.7 million, including $2.0 million in 2009; and (ii) Irrigation Rehabilitation of the Maliana I Scheme – total budget of $7.1 million, including $2.4 million in 2009 and 2010. Secondly, China and Korea assisted MAF with a hybrid rice program ($6.0 million in total and $3.0 million in 2009, for seed and fertilizer). And thirdly, in early 2009 before the main rice-growing season MAF purchased and handed out (free-of-charge to selected farmers) 1,260 hand tractors, and 102 large and 100 medium tractors (at a cost of about $16 million) with the objective of increasing the area planted to irrigated rice (first and second crops).

- NP 2: Rural Development: Responsible government entities: MED; Ministry of Infrastructure; and Secretary of State for Vocational Training and Employment.
    - Rationale: smaller-scale infrastructure projects with high and immediate job-creation are essential for the stabilisation of the country (rural roads, rehabilitation and maintenance, mini-markets, and food-for-work).

7. MAF's Organizational Overview

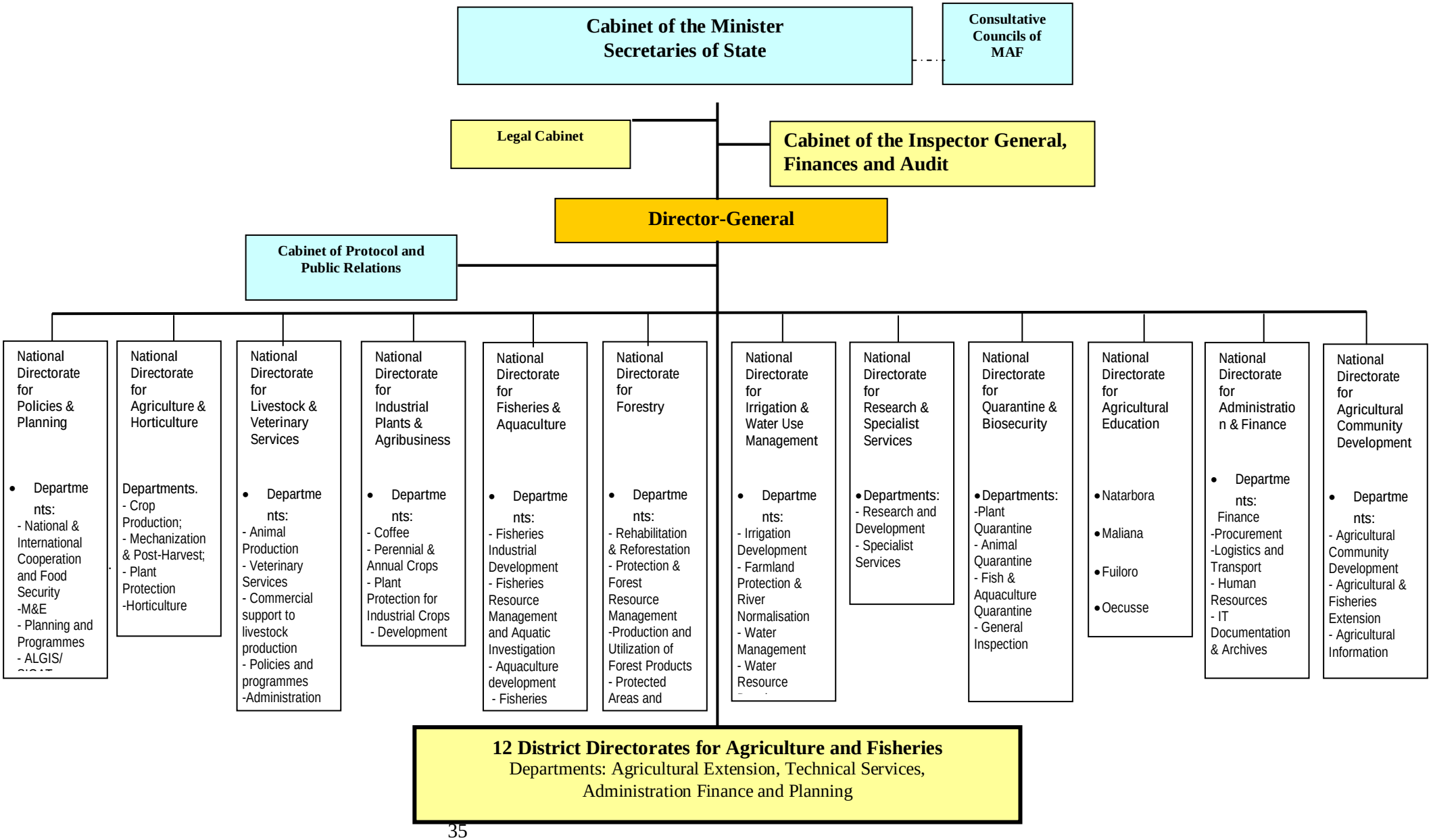
7.1. MAF's Organizational Structure

MAF is responsible for designing, executing, coordinating and evaluating the policies approved by the Council of Ministers for the largest sector of Timor-Leste's economy, i.e. agriculture, forestry, livestock, fisheries, irrigation, research and rural development, including setting standards, regulation and inspection (Decree Laws 07/2007 and 18/2008).

Under the Minister of Agriculture and Fisheries, the ministry is divided into three Secretariats of State for Agriculture/ Arboriculture, Livestock and Fisheries. A consultative council of experienced senior ministry staff, and cabinets on legal matters and auditing, supports the political structure of the Ministry (Figure 1). The Director General is the head of the ministry's civil service with 12 National Directorates and 13 District Directorates. Nine National Technical Directorates are responsible for the development of the various sub-sectors; one is responsible for planning, monitoring and policy development, one for administration and finance, and one for regulatory services (Figure 1). The National Directorates' mandates, set-ups and tasks are described in detail in 'MAF – Overview of Policies and National Directorates – their Resources, Activities and Plans for 2009'.

[25] Working Together to Build the Foundations for Peace and Stability and Improve Livelihoods of Timorese Citizens. 2009 National Priorities Program, Concept Note.

Figure 1: MAF's Organization



7.2. MAF's Staffing

Organizationally MAF is partially 'de-concentrated', with staff in the National Directorates working in Dili and field staff working in the 13 districts under a District Director of Agriculture. The District Directorates consist of three departments: Agricultural Extension, Technical Services, and Administration Finance and Planning. By 2009, due mainly to the appointment of additional temporary staff, MAF was employing 1823 national and district staff, an increase of 125% over the staffing complement in 2008. The current (end of 2009) staffing schedule consists of 329 permanent, 1,494 temporary, and 22 political appointments. All senior management positions are permanent personnel and most of these are located in Dili. Fourteen permanent and 151 temporary positions remain vacant and MAF has applied to fill these positions in 2010. Fifty three percent of MAF's staff are posted in the districts - this number is high due to the recent recruitment of about 376 *Suco* Extension Officers (SEOs) on a temporary basis[26]. Table 1 shows MAF's staff list at the end of 2009, and Table 2 lists MAF's staff qualifications.

Table 1: MAF's Staffing Distribution in 2009

Unit	Total Staff		Permanent Staff		Temporary Staff		Total Staff
	Central	District	Central	District	Central	District	
Cabinet of the Minister	7	-	-	-	7	-	*7*
State Cabinet of Agriculture & Arboriculture	5	-	-	-	5	-	*5*
State Cabinet of Livestock	5	-	-	-	5	-	*5*
State Cabinet of Fisheries	5	-	-	-	5	-	*5*
Cabinet of Protocol and Public Relation	6	-	-	-	6	-	*6*
Cabinet of Inspection & Audit	4	-	-	-	4	-	*4*
Legal Cabinet	5	-	-	-	5	-	*5*
Cabinet of Director General	3	-	1	-	2	-	*3*
National Directorates	808	189	234		763		*997*
District Directorates	0	786	0	94	0	692	*786*
Total	848	975	*235*	*94*	*802*	*692*	*1,823*

Note: regular positions total 1,801; political appointments total 22; Total =1823.
Source: MAF's National Directorates for Administration and Finance, and Policies and Planning, December 2008.

[26] In addition, a further 24 SOEs are expected to appointed in 2010, bringing the full complement up to 400 sraff.

Table 2: MAF's Staffing Qualifications in 2009

Unit	Qualification		
	Professional	Technical	Non-technical
Cabinet of the Minister	4	2	1
State Cabinet of Agriculture and Arboriculture	3	1	1
State Cabinet of Livestock	3	1	1
State Cabinet of Fisheries	3	1	1
Cabinet of Protocol and Public Relation	1	4	1
Cabinet of Inspection and Audit	1	3	0
Legal Cabinet	2	2	1
Cabinet of Director General	1	1	1
National Directorates	88	822	87
District Directorates	44	707	35
TOTAL	150	1,544	129

Source: 'MAF – Overview of Policies and National Directorates – their Resources, Activities and Plans for 2009'.

7.3. Investment and Operational Budgets

MAF's 2009 and 2010 budgets for its National Directorates, and staff numbers for SoL III's three key national directorates; (i) Agriculture and Horticulture (NDA&H), (ii) Research and Special Services (NDR&SS), and (iii) Agricultural and Community Development (NDACD) are listed in Table 3.

Table 3: MAF's National Directorate Budgets and staff for 2009 and 2010

National Directorate	2009 Budget ($'000)	Staff in 2009	2010 Budget ($'000)
Policy and Planning	303		256
Research and Specialist Services	523	105 (52 in Dili)	526
Agricultural Education	654		592
Forestry	730		530
Quarantine and Biosecurity	460		435
Livestock and Veterinary Services	568		758
Agriculture and Horticulture a/	16,363	158 (43 in Dili)	2,518
Coffee and Industrial Plants & Agribusiness	692		360
Fisheries and Aquaculture	771		779
Administration and Finance	2,285		1,129
Agricultural Community Development b/	412	436 (60 in Dili) c/	1,295
Irrigation	6,041		3,714
TOTAL	29,802		12,892

a/ Reduced substantially due to no mechanization budget in 2010.
b/ Includes agricultural extension
c/ Will be increased to 460 in 2010 with the appointment of an additional 24 SEOs.

7.4. Coordination Bodies

MAF is the government institution mandated for the development of Timor-Leste's main rural sub-sectors, i.e. agriculture, forestry, and fisheries; and for coordinating rural development[27]. MAF has personnel at all levels, from national to local, and is working with farmers, other government agencies, the private sector and DPs. The ministry has therefore established coordination mechanisms at all levels to harmonize functions; and for planning, implementation and monitoring, as follows:

- Ministerial level: council of ministers, national development planning, inter-ministerial working groups (e.g. rural development, national food security committee), sector investment committees, and sector strategic planning committees.
- National Directorates level: harmonisation meetings with DPs, directorate co-ordination meetings, joint annual planning meetings, consolidation of district plans, national M&E plans, public counselling, and task forces.
- District and Sub-district Levels: district coordination committee (pilot), district disaster management committee, joint annual planning meetings, sector planning and coordination, consolidation of local demands, NGO harmonisation meetings, district M&E systems, and food security.
- *Suco* and local: *suco* and *aldeia* development plans (pilot), interest and user-group plans (agricultural extension and irrigation), and community-based organizations and associations plans (pilot).

Figure 2: MAF's Coordination Bodies

[27] Note: there is some debate about this latter role as according to the Rural Development Framework, MED is responsible for this task.

8. MAF's Strategic Plans

MAF's 'Policy and Strategic Framework – 2004' was, until recently, and prior to the release of the National SDP, the policy and strategic document which guided sector development. In 2009 MAF's broad role in rural development was defined in Axis 1 of the national RDF which was prepared by MED with EC support. Axis 1 of the RFD describes MAF's overall rural development responsibilities which include: (i) Purpose - sustainable increases in nutrition and food security and reduced poverty for farm households and rural communities; (ii) Output 1 – farming and food production; (ii a) Output 1.1 – increased yield(s) and production of main foodcrops; (ii b) Output 1.2 – sustainable upland farming techniques integrated into upland farming systems; and (ii c) Output 1.3 – increased production of cash crops for domestic and export market(s). These objectives fit into and comply with the political objectives for Timor-Leste's agricultural sector which are outlined in Section 6.5.

MAF's more specific objectives and supporting development interventions which are not likely to be funded directly by GoTL (and are therefore targeted at supporting DPs) are outlined in a strategic plan prepared by FAO in early 2010. MAF also prepared a separate, stand-alone strategic plan (based on development interventions which will not be funded by DPs) for inclusion in the Prime Minister's Strategic Development Plan. The World Bank has completed the analysis of a number of agricultural policy issues which form the background to an Agricultural Productivity Improvement Program[28].

9. Related Supporting Programs

These are listed in Appendix 4.

10. Constraints and Issues – Related to SoL III

10.1. Overview

While it is desirable that market-based exchange mechanisms be developed under SoL III as a complement to the production of formal seed under government supervision, there is currently very limited commercial trade in seed, and correspondingly poorly developed market mechanisms. This is reflected in an almost total absence of specialised seed merchants in any marketplace with the exception of a few traders who sell imported hybrid vegetable seed which cannot be produced locally. This situation is the result of a number of factors, including:

- The majority of farming households in Timor-Leste are located in the poor upland areas, with substantial annual food deficits and relatively limited cash incomes to purchase crop inputs.
- GoTL is still in a post-conflict situation, with policies heavily oriented towards free provision of inputs (including seed) to farmers; coupled with a prevailing hand-out mentality among the rural population. This handout mentality is often fuelled by donor programs and NGOs which commonly provide free seed to farmers.
- Cultural norms and kinship ties are strongly oriented towards the free exchange of inputs such as seed and planting material between families, rather than the use of market-based exchange mechanisms.
- The predominance of open-pollinated and vegetatively propagated varieties which lend themselves to rapid spread through non-commercial channels.

[28] Timor-Leste: Raising Agricultural Productivity: Issues and Options – A Policy Note; the World Bank, January 2010.

10.2. Policy and Strategic Environment

The policy environment outlined in Section 8 is confusing and has major implications for SoL III. It indicates the need for a flexible and programmatic approach to agricultural development which is able to respond to changing objectives and strategic directions, as MAF responds to political pressures (particularly in terms of national food production) and the shorter-term objectives of numerous DPs. SoL I and II were able, to some extent, to avoid this confused policy environment because of the Program's tight focus on foodcrop research and development, and initial development of Timor-Leste's seed industry. However, as SoL becomes a truly national Program it will have ensure that it complies with GoTL's policies for the sector, the most important of which is likely to be free handouts of agricultural inputs, including seed.

10.3. Institutional Capacity

Whilst SoL II has made considerable progress in terms of building individual and institutional capacity directly related to the Program, MAF is aware of and has requested assistance with considerably more support to enable the ministry to achieve the national objectives of rural poverty reduction and food self-sufficiency. Capacity building is required across all of MAF's 12 national directorates and its 13 district offices, but this is well beyond the remit of SoL III, both in terms of focus and budget. Therefore the design for Phase III will need to focus on those aspects of capacity building which need to be strengthened in order for the next phase to deliver the expected end-of-Program outcomes.

10.4. Product Focus and Poverty

GoTL policy is heavily oriented towards the production of irrigated rice, with upland farming systems relatively neglected. The poorer sections of Timor-Leste's rural population are not rice growers – they live in the rainfed highlands and subsist on maize, subsidized rice and mixed roots and tubers. In addition, a high percentage of the nation's rice growers also grow maize and mixed roots and tubers to mitigate against the risk of rice crop failure. This situation means that SoL III needs to be cognisant of the interaction between crop types (rainfed and irrigated) and the location of pockets of severe rural poverty, and to ensure that biases (in terms of foodcrop focus) are avoided.

10.5. Donor Coordination

The issue of donor coordination follows on from the one related to the MAF's policy environment. Numerous development partners continue to attempt to establish 'their strategic niches' within MAF with some focusing on selected geographic areas (districts) such as the EC-funded Rural Development Programs (RDPs) and others focusing on specific products, e.g. Portugal's support for the coffee industry. This causes some confusion in MAF and makes implementation coordination and monitoring and evaluation difficult. In addition, under this scenario the Ministry of Finance is tempted to limited MAF's operational budget because when there is a perception that the ministry is 'over-supplied' with bilateral support. As with the policy environment issue, the issue of lack of development partner coordination means that SoL III will need to carefully define and engage with its cooperating partners (e.g. for seed distribution) and ensure that the Program is fully aware of the myriad of development initiatives which are being implemented in its target districts by numerous DPs.

10.6. Capital and Operational Budgets

Government budget allocations to support public sector infrastructure and operational costs in the agricultural sector are highly uncertain and constrained, particularly given MAF's sharply increased budget in 2009 which focused on irrigated rice production – mechanization, irrigation infrastructure, and hybrid rice seed and free fertilizer. This budgetary scenario is likely to constrain MAF's capacity in the longer-term in terms of the ongoing evaluation and release of new varieties through SoL's adaptive research process, and the production of formal seed through government channels.

10.7. Operational and Extension Planning

The newly-appointed SEOs have relatively limited technical and extension skills and negligible operational budgets. This severely constrains their ability to work with farmers on improved seed production and distribution activities. In addition, MAF has limited institutional capacity to plan and implement nation-wide programs which focus on foodcrop production in all agro-ecological zones. To some extent this issue will be addressed by the forthcoming RDP IV, but this program is likely to be constrained by lack of GoTL operational budget at the sub-district and suco levels. Implications for SoL III include the need to engage with the SEOs in a way which does not rely on their access to resources provided by GoTL, and where appropriate to assist with their professional development – but only to the extent necessary to achieve the objective of using the SEOs to distribute formal seed and support informal seed multiplication and distribution through the establishment of community seed production groups (CSPGs).

10.8. Decentralization

GoTL's plan to decentralize its governance structure down to municipalities with elected mayors as the chief administrators has implications for SoL III. At present SoL is considered to be a national Program which runs out of MAF's central office in Dili. However, decentralization will mean that Phase III will have to engage more closely with MAF's district and sub-district offices as local development plans and associated budgets will be formulated and implemented at this level in MAF's hierarchy. This situation also has implications in terms of chains of command in that at present district-based staff still report back directly to their national directorates even though they are working at the district and below levels, and are therefore theoretically responsible to their district directors[29].

11. Design Implications for SoL III

11.1. Product Focus – Setting the Scene for SoL III

11.1.1. Major foodcrops in Timor-Leste

Figure 3 shows that maize is the most important crop in Timor Leste (36% of production by weight), followed by rice (25%), cassava (21%) and sweet potato (18%). Non-rice crops account for at least 75% of Timor Leste's basic food production[30]. Timor Leste's farmers grow a wide range of foodcrops and very few are specialists. Rice is only grown by 31% of farmers (61,000

[29] RDP III in Manufahi District has encountered this administrative and line-responsibility problem.
[30] Excluding vegetables and fruit, the proportion of non-rice foodcrops could be as high as 80% when all types of food are considered.

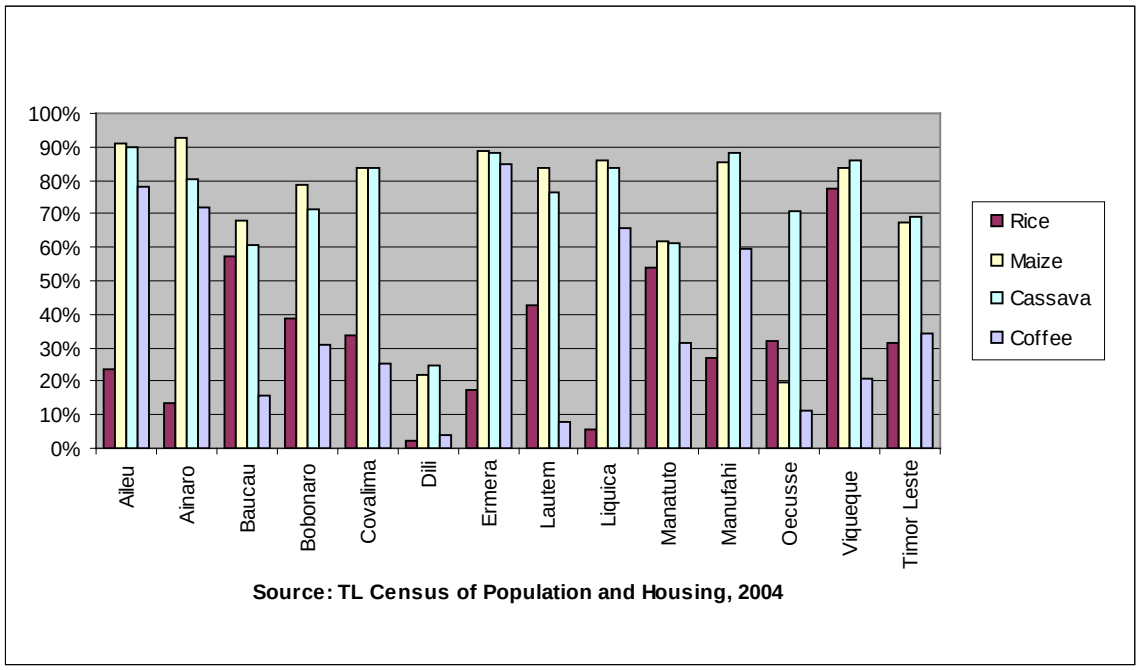
households); whereas 34% of households grow coffee (67,000 households) and nearly 70% of households grow maize and cassava (132,000 and 134,000 households, respectively)[31].

These figures on the importance of various foodcrops in Timor-Leste should be used to focus the production of improved seeds and planting materials on crops which are grown by the majority of the rural population. At present (2009) SoL II produces about 60 Mt of rice seed, 20 Mt of maize seed, 18 Mt of peanut seed, 96,000 sweet potato cuttings, and 40,000 cassava canes. As detailed in Appendix 9 SoL III will need to produce about 50 Mt of rice seed, 100 Mt of maize seed, 25 Mt of peanut seed, 600,000 sweet potato cuttings, and 600,000 cassava canes annually if the Program is to produce sufficient seed and planting materials to meet the demand. SoL III will need to substantially increase the production of maize seed, sweet potato cuttings and cassava canes if the Program is to impact on a large percentage of the rural population.

Recent data collected by SoL (2008)[32] support the conclusion that there is a current bias towards rice at the expense of other crops. Although irrigated rice production is important to Timor-Leste, other sectors of the food and cash crop production systems warrant equal support and budget allocation if the poorer and more isolated rural communities are to experience improved livelihoods and the Nation is to become less-reliant on food imports. Table 3 in the SoL report provides information on foodcrop production patterns amongst participating farmer households (612) in terms of the variety of crops planted. In 2008 there was a strong reliance on the production of a small number of key staple foods which are reliable in unpredictable monsoon environments. The most common crops planted by 60% or more of farmers were cassava, pumpkin, maize and sweet potato. Only 20% of farmers grew irrigated rice. These figures reflect the dependence on upland and rainfed foodcrops by the majority of Timor-Leste's farming households. A similar SoL survey in 2007 on upland cropping patterns also revealed widespread reliance on a small number of key cultivars - staples such as maize were grown by 73% of households, cassava (81.2%), sweet potato (73.2%) and pumpkins (82.3%)[33].

[31] Note: this list of household numbers is not the same as that listed in Table 1 in Appendix 9 because the latter has been adjusted for an increase in the number of households since the last reliable survey in 2004.
[32] BUKA DATA LOS ('Looking for true or reliable data' – Tetum): Baseline survey of Seeds of Life participating farmer households (612 households) in selected sub-districts of Timor-Leste in 2008.
[33] Note the large numbers of families growing tubers for food production.

Figure 3: Percent of Households Growing Major Crops in Timor-Leste, by District



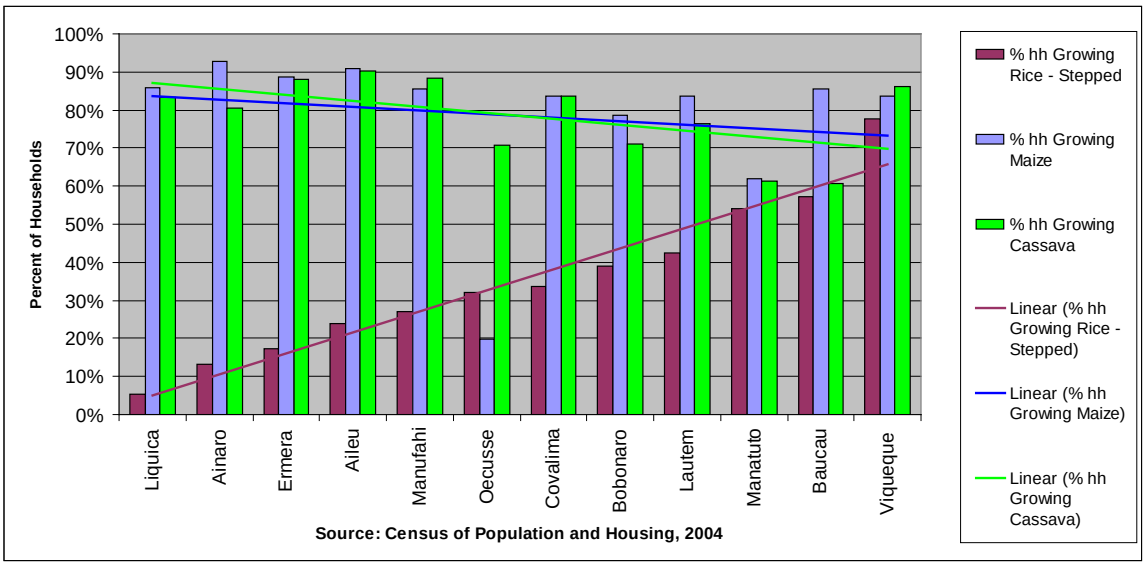
11.1.2. Crop inter-relationships

Timor-Leste's farmers grow a wide range of food and cash crops with the objective of reducing the risk of hunger following crop failure. The various associations between crops (e.g. the importance of maize and cassava in coffee growing areas) have implications for development interventions which aim to increase crop production and rural incomes.

It is important to note that rice growers are also major maize and cassava growers. The data in Figure 3 are more informative when the district order on the x axis is changed. Figure 4 lists Timor Leste's rice-growing districts in increasing (or stepped) order of importance (percentage of households growing rice) and shows that as the percentage of households growing rice increases, the percentage of households growing maize only declines marginally[34], as does the percentage of households growing cassava. These trends show that maize and cassava are important foods in all districts, irrespective of whether rice is an important crop or not. This conclusion has important implications in terms of where publicly-funded rural development resources are focused (including SoL III's) if the objectives are to increase foodcrop production and reduce rural poverty.

[34] Oecusse is an exception to this trend – only a small percentage of households grow maize.

Figure 4: Stepped Percent of Households Growing Rice, Maize and Cassava, Selected Districts



11.1.3. Poverty and crop types

Figure 5 shows stepped poverty distribution (districts listed by increasing levels of poverty) and the percent of households growing rice. Three of the four major rice-growing districts have the lowest levels of poverty. The poor grow less rice, but this does not mean that programs to support rice production would necessarily benefit the poor because they live in areas which are not suitable for irrigation (lack of irrigation water and unsuitable soil types). Therefore other food security and poverty reduction strategies need to be pursued if the population which live in rainfed areas is to experience improved standards of living.

Figure 5: Poverty Distribution (stepped) and Percent of Households Growing Rice

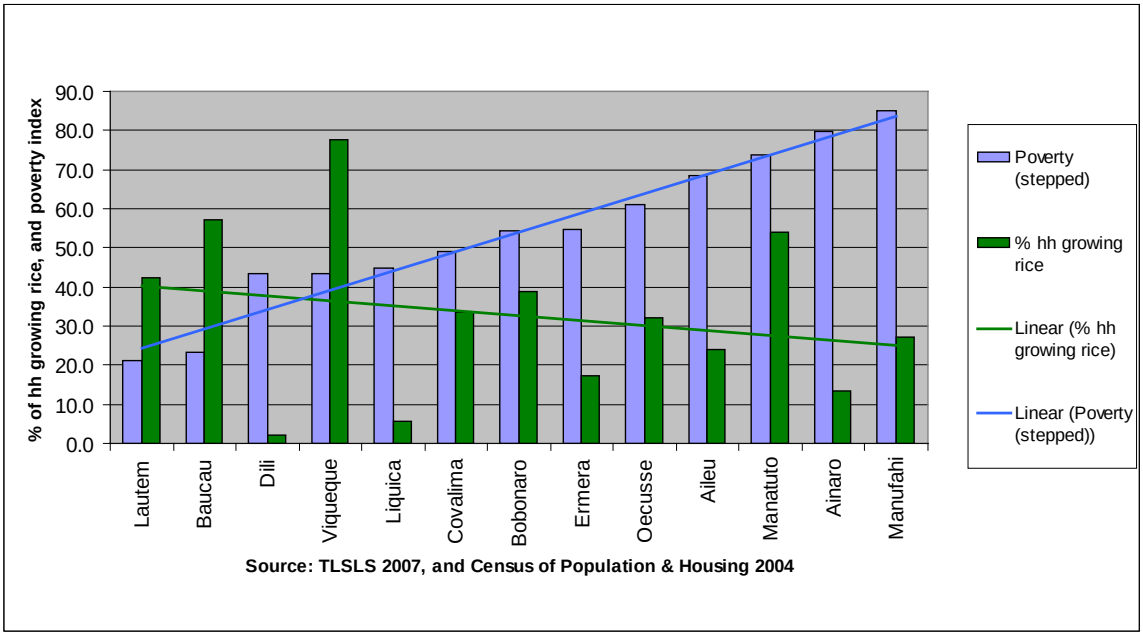


Figure 6 shows stepped poverty distribution and the percent of households growing cassava. The figure shows that as poverty increases, the percentage of households growing cassava also increases. Clearly cassava is a very important crop for the poorer sectors of the upland rural economy.

Figure 6: Poverty Distribution (stepped) and Percent of Households Growing Cassava

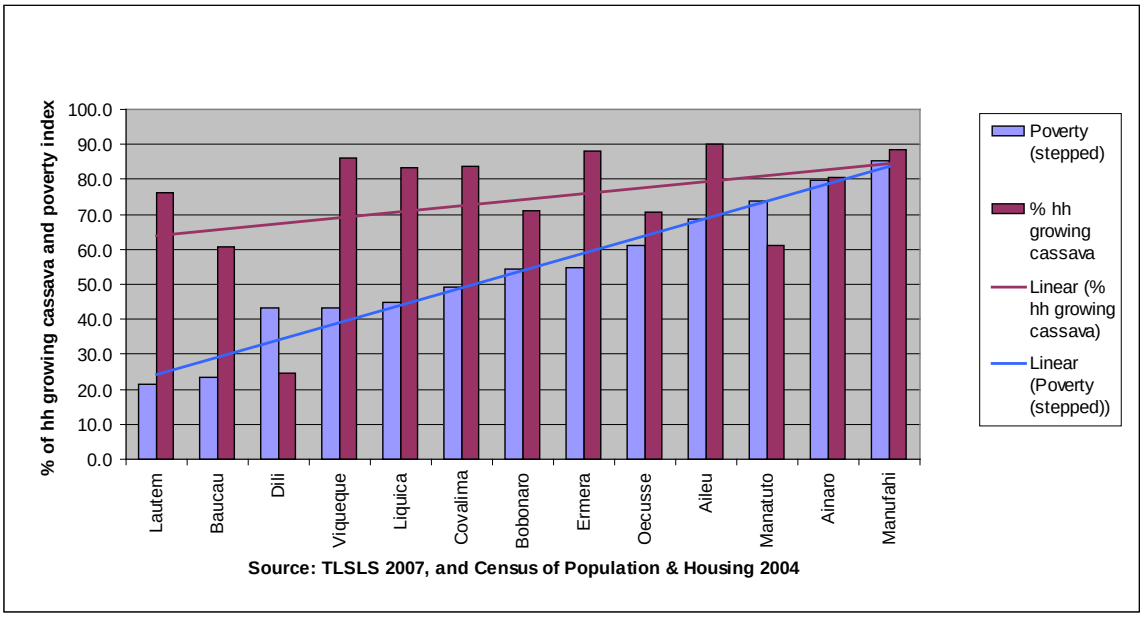
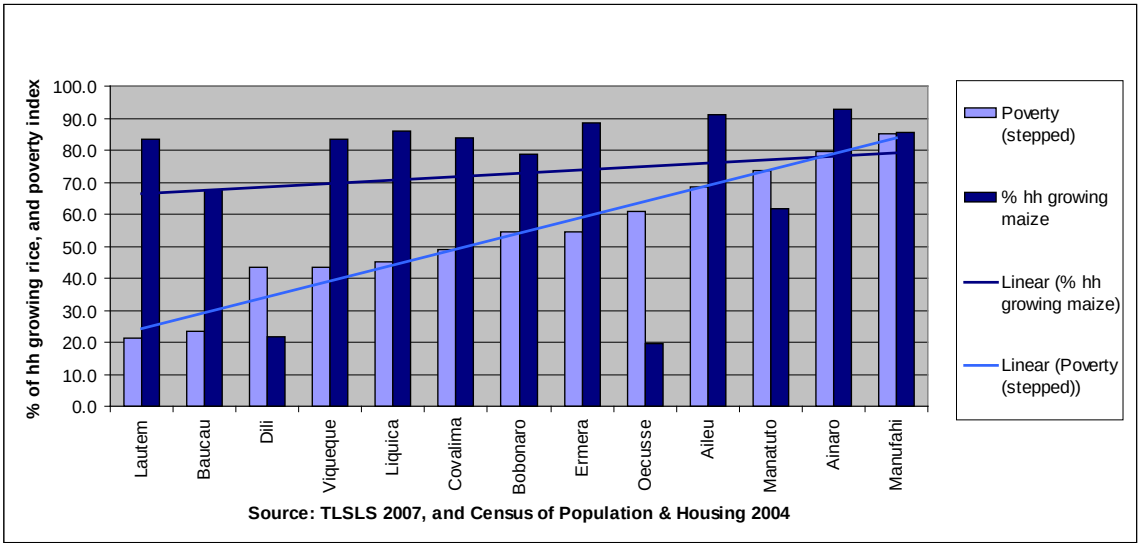


Figure 7 shows stepped poverty distribution and the percent of households growing maize. As poverty increases, there is a slight increase in the percentage of households growing maize. Therefore maize is an important crop for all sectors of rural society.

Figure 7: Poverty Distribution (stepped) and Percent of Households Growing Maize



There are some very clear conclusions from the foregoing analyses which have obvious rural development policy implications, and by default, implications for SoL III. These are: (i) rice growers are not the poorest of the rural poor; (ii) poorer people grow more cassava; and (iii)

maize is an important foodcrop, irrespective of poverty levels. These conclusions have ramifications for SoL III – the next phase of this important national Program must focus on all of Timor-Leste's major foodcrops, and not follow MAF's policy of focussing heavily on irrigated rice. The current seed and planting material production figures (Section 11.1.1) indicate that the Program is already producing sufficient seed of improved rice varieties (60 Mt per annum, compared with a demand of Mt 50 per annum). However the demand for maize seed is currently not being met (100 Mt compared with 20 Mt), even though maize is by far the most important foodcrop in Timor-Leste and is grown by the majority of farmers.

11.2. Collaboration with Development Partners

During Phase II SoL relied on a wide range of DPs (bilateral, multilateral and NGO) for the distribution of improved seeds and planting materials. For example: (i) CARE International established nearly 300 maize seed production and distribution groups in Bobonaro and Liquica; (ii) IPAD (Portuguese Aid) cooperated by distributing maize seed in Ermera, and by establishing contract seed production groups in Liquica[35]; and (iii) GTZ distributed improved rice and maize seed in Maliana and Baucau. In addition, where possible SoL II used MAF's SEOs to distribute improved planting materials and in the process built some capacity in terms of knowledge of how these varieties can impact on food production without major changes to production systems.

The options for Phase III in terms of targeting seed distribution partners are: (i) continue with the informal approach to seed distribution developed during Phase II[36]; or (ii) build the institutional capacity and skills within MAF's national extension system, utilizing the recently-assigned SEOs[37]. The design team and MAF are of the opinion that the best strategy for Phase III is to institutionalize seed and planting material distribution through MAF's extension system, rather than through DPs and NGOs. This recommendation does not mean that non-MAF seed distribution channels will be ignored, but rather that they will not be afforded disproportionate support compared with the support provided directly to MAF. In fact the default strategy, should the MAF/ SOE strategy fail, should be more intensive engagement with DPs, see Section11.8.2 for more discussion on this topic.

In a broader context, cooperation and collaboration between the numerous DPs who currently assist MAF (see Appendix 4 for details on these programs) is not efficient or particularly effective. There are few examples of donors working in unison (AusAID's funding of MAF's Biosecurity Program through FAO is an exception) and most development interventions are implemented under 'traditional' bilateral arrangements, e.g. the EC-funded RPDs II and III (implemented by GTZ and Landell Mills). Implications of this situation for SoL III include: (i) the need to allocate resources and budget with the objective of improving international cooperation between those agencies which are working with MAF – for meetings, conferences, etc; and (ii) Advisor and MAF staff time for coordination meetings, particularly for the coordination of seed and planting materials distribution activities. In summary, the effort required to bring MAF's development partners to 'one table' with the objective of focussing all support on a few key priority issues, rather than the current uncoordinated approach, should not be under-estimated when designing SoL III.

[35] This program was not particularly successful because of its large scale and poor in-crop weed control.
[36] This was successful in Phase II, but in some case resulted in the wastage of scarce and valuable high quality seed.
[37] And perhaps leveraging-off the forth-coming RDP IV which may provide some direct support to MAF's extension system and its staff at all levels.

11.3. Coordination with MAF's Directorates

11.3.1. Counterpart for Australian Team Leader and management structure

The design of SoL II was based on the appointment of a full-time counterpart for the Australian Team Leader (ATL) working out of the Program Office. It was intended that this counterpart operate as the link between the ATL and the two Timorese Co-Program Leaders (the National Directors of the NDR&SS and the NDA&H). However soon after the commencement of Phase II the incumbent won a scholarship to South Korea to study for his PhD. Therefore SoL II's ATL has worked without a full-time counterpart for most of Phase II. This situation has resulted in inefficient Program management at times because when day-to-day decisions were required it was often difficult for the ATL to gain access to one or the other (or both) the Co-Program Leaders. The design team recommends that this bifurcated management structure should not remain in place for SoL III. Furthermore it is essential that full-time Timorese counterparts be appointed to work with the Advisors advising each component in Phase III (see Table 5) for an outline of the Program's strategic framework. Such a recommendation could mean that SoL III needs to be elevated within MAF's organizational structure to a Directorate in its own right, or to a position which is above Directorate level. The latter would be preferable.

11.3.2. Additional National Directorate in Phase III

MAF's national directorates become increasingly involved in SoL as the Program progressed through its first two phases - Phase I focused on building adaptive foodcrop research capacity in the NDR&SS (and the University of Timor Lorosae [UNTL]) and Phase II expanded to include the NDA&H as seed production became more important. Now that Phase III will became a national Program is will be necessary to include a third directorate (NDACD) as a key counterpart, mainly because the SEOs work through this directorate and the district and sub-district levels. These staff will have ley roles in distributing seed and forming community seed production groups. This means that managing SoL III will require more cross-directorate coordination, hence the recommendation that a Project Management Unit (PMU) be established which can operate at a higher level in MAF's hierarchy than at the directorate level.

11.3.3. Cooperation with MAF's non-SoL initiatives

During Phase II the NDA&H made decisions independently of SoL II (which is its prerogative), which although related to SoL's activities were not discussed with SoL until after the event, or not at all. For example the annual importation of emergency seed for distribution to farmers who lost seed due to drought or other natural disasters proceeded with minimal discussions with SoL – both in terms of the direct impact on SoL's own seed distribution program, and the broader ramifications from diluting the impact of SoL's improved foodcrop varieties.

Another example of this unfortunate lack of cooperation between SoL and its counterpart Directorates is MAF's use of its share of the Referendum budget to construct eight seed processing and storage facilities in Manufahi, Viqueque, Oecusse, Maliana, Lautem, Covalima, Baucau and Loes Districts. Whilst in the longer-term it may be desirable to have such facilities in all districts (an objective of the NDA&H) this decision was made independently of SoL II which currently has similar facilities in Maliana (town) and at Baucau. Such duplication and the construction of seed facilities without an agreed national and long-term seed production and distribution plan is an example of how cooperation and national seed planning and distribution will need to improve during Phase III.

Phase III is not likely to not have sufficient budget to equip and operate MAF's eight new seed processing and storage facilities. Furthermore, Appendices 1 and 9 and indicate that it is not necessary for Timor-Leste to have such facilities in all districts – it is probably more efficient and cost-effective to concentrate rice and maize seed production in a few areas/districts with comparative advantages in terms of access to functional national roads, reliable supplies of irrigation water, and land/soil resources which are conducive to maize seed production.

11.4. MAF's Budget Availability

11.4.1. Research Stations – equipment and operations

Table 4 shows MAF's GoTL and donor budgets during the period 2002 to 2009. The ministry's operational and capital budgets have increased almost exponentially since 2002/03, from US$1.5 million in 2002/03 to US$33.9 million in 2009. However, and as outlined in Section 10.6, a large percentage of the 2009 budget was allocated to the mechanization and irrigation construction programs. MAF's 2010 budget of US$12.9 million is considerably less than in 2009, e.g. in 2010 the NDA&H has a budget of US$2.52 million (down from US$16.4 million due to finalization of the mechanization plans), the NDR&SS only has a budget of US$0.53 million (US$0.53 in 2009), and the NDACD (responsible for managing and operating the SEOs) has a budget of US$1.3 million (up from US$0.41 million in 2009, but the directorate is now responsible for many more field-based staff).

The ministry publicly stated (to the SoL III design team) that it would have faced severe budgetary problems in 2009 in terms of operational funds for the Research Stations which were rehabilitated under SoL II (Betano and Loess) and for the provision of equipment to operationalize Loess, if it had to assume full responsibility for all salaries and operational costs. This means that it is unlikely that MAF will have its share of funds (operational and capital) required to complete the proposed new research station at Darasula - to-date only the boundary fence has been completed using Referendum budget funds. This situation also means that any plans for an irrigated rice research station or an high altitude station (for testing wheat, barley and other temperate annual and perennial crops) will have to be fully funded (development and operations) thorough SoL III.

Table 4: Total budget allocated to MAF 2002-2009 (US$ million)

Fiscal year	Govt. Budget	Donor Cont.	Total
2002/03	1.5	16.6	18.1
2003/04	1.6	17.8	19.4
2004/05	1.6	7.6	9.2
2005/06	4.9	7.3	12.2
2006/07	14	3.6	17.6
2008	30.7	(27.0*)	(57.7)
2009	33.914	(19.7*)	(53.6)
2010	12.9	na	na

11.4.2. Agricultural extension services

The budget ramifications referred to in Section 11.4.1 are even more serious when MAF's inability to fund and support its newly appointed SEOs is taken into account (also reported to the SoL III design team). Ideally SoL III should build the capacity of these staff to enable them to operate as integral members of the Program's seed and planting material (and technical production advice) distribution system. However it is apparent that unless: (i) SoL III directly funds the operations and training of at least some of these staff (in target districts/sub-districts); and/or (ii) the Program partnerships with other DPs[38] which are or will support MAF's NDACD (the directorate responsible for extension, information and community development) SoL III will not be able to rely on the SEOs to distribute seed and planting materials through Component 2, and to provided support for community-based seed production through Component 3.

[38] One possibility is the EC-funded RDP IV which will allocate about US$8.0 million to the NDACD.

The SoL III design team discussed this issue with MAF and the Secretary of State for Agriculture and concluded that MAF will be unable to fund the SEOs to the level needed for them to be effective members of the SoL III implementation team. Therefore the design of SoL III is based on the use of Australian funds to cover some operations and training activities for these staff – but only to the level necessary to enable the SOEs to function as seed distributors and organizers of community seed production groups. This will cost about A$400 per SEO per year and the funds will be channelled directly through MAF's district offices – see Section 11.7

Note: the design of RDP IV was not complete by the time the SoL III design team left Timor-Leste. However during meetings with the RDP IV design team it became apparent that there could be opportunities for SoL III and RDP IV to cooperate and work together through MAF. This is because it seems that RDP will provide some SOE operating funds, and SoL III will have the 'products' (improved seed and planting materials) which the SOEs can use as the basis of learning how to provide services to farmers. Such partnerships should be encouraged by SoL III's implementation team as an efficient way to train, operationalize and support MAF's fledgling agricultural extension service.

11.5. Decentralization

11.5.1. Progress

Reports on the progress of the Ministry of State Administration's role-out of its plans to decentralization local administration (with the objective of electing District Mayors and assigning the mayors and local administration considerably more autonomy in terms of local development planning and budgeting, and budget expenditure) are confusing and inconclusive. Some districts such as Bobonaro seem to be moving to the new system quite quickly[39] whereas others are not sure when they will become independent from Dili. At present MAF remains as one of the least decentralized ministries in the GoTL, probably because in the past it has been the focus for nationally-planned and -directed irrigation development and mechanization programs. Now that these programs have been completed (National Priority No. 1 for 2010 is infrastructure) it is possible that MAF will speed up its decentralization processes, at least in some districts. Note however the point made in Section 10.8 which relates to chains of command.

11.5.2. Implications/risks for SoL III

MAF's limited decentralization to-date and its unclear plans for the future mean that SoL III will need to remain flexible in terms of the Program's component-specific implementation strategies. In fact SoL III may need two basic implementation strategies – one for decentralized districts and one for those districts which are still operating under the Dili's direct control. Furthermore, as SoL III progresses it will need to adjust its implementation arrangements as target districts change their planning and budgeting, and budget expenditure, systems. In summary SoL III must be planned as a flexible Program rather than as a project with specific activities. The Terms of Reference for the design of SoL III indicate the need for such an approach.

11.6. Capacity Building Experiences

11.6.1. Overview and lessons

[39] The SoL III design team met with MAF's District Director in Bobonaro and he indicated that Bobonaro is already operating with a high degree of independence from the national system.

MAF has been the recipient of considerable capacity building support since Timor-Leste's independence in 2002. The ministry was firstly support by three Agricultural Rehabilitation Projects (ARP I, II and III) which were funded through a multi-national trust fund and managed by the World Bank. These early projects focused on rehabilitating infrastructure (mainly irrigation), agricultural and livestock production, watershed management, agro-forestry, and (importantly) building MAF's capacity. MAF directly-appointed and managed technical and managerial Advisors to support the three ARPs[40]. It is important to note that the ARPs were under-pined by a fundamental but erroneous assumption – that goods and services would be provided and supplied by Timor-Leste's emerging private sector and NGOs. However after eight years of relying on this strategy Timor-Leste's rural development indicators had not changed. Reliance on the private sector and NGOs proved to be a flawed strategy - and it was not until 2009 that MAF decided to appoint and train a national agricultural extension service. During the interim period (2002 to 2009) MAF struggled to fulfil its mandate despite considerable bilateral support in the form of two RPDs which followed on from the ARPs.

The ARPs and the RDPs, and other MAF-focused programs (SoL I and II, ongoing support from USAID and IPAD, GTZ's bilateral programs, etc.) provided significant capacity building activities such as on-the-job managerial and technical training, overseas training across a wide range of disciplines, and Advisor mentoring in a range of topics. Whilst MAF has not conducted a formal assessment of its capacity and ability to fulfil its mandate (see Section 6.3 for details), it is generally accepted by Timor-Leste's donor community that despite prolonged capacity building efforts (since 2002) the ministry remains constrained by poor managerial, technical and extension/community development skills. When questioned about ongoing constraints and issues MAF's senior management from the Minister down constantly request additional capacity building support[41] [42].

11.6.2. Implications for Sol III and recommendations

Years of intensive capacity building efforts within MAF by numerous DPs using a wide range of capacity building strategies have not resulted in significant changes in MAF's ability to service its rural constituents in an efficient and cost-effective manner. This scenario has major implications for the design of SoL III, with a fundamental precursor question needing to be posed and answered before it is possible to decide how to proceed in terms of identifying MAF's capacity building activities and focus during Phase III. This is: 'should SoL III attempt to address the myriad of skills, systems and institutional capacity constraints which still beset MAF, or should the Program focus only on those directorates and divisions within MAF which if not supported will impact on the effectiveness of Phase III?' Based on past experience, and comments from many of MAF's DPs, it seems on balance that the latter strategy is less risky and more likely to impact positively and more directly on Phase III outcomes.

[40] However their effectiveness is questionable as the advisors were constantly hindered by lack of transport and operational funds, and no overall management and coordination.
[41] SoL I and II achieved some notable, impressive and sustainable increase in MAF's staff's ability to plan and implement adaptive research programs to identify and release improved varieties of foodcrops. This is one of the Program's main achievements and deserves wide-spread recognition.
[42] An interview with the manager of the Spanish aid program to MAF during the design of SoL III indicated that MAF continues to use inefficient managerial and financial practices.

In other words, the design team considers that it is beyond the scope of SoL III to attempt to address some of MAF's more wide-spread and entrenched capacity limitations, and that it would be more realistic and efficient for Phase III to focus on building research, planning and managerial capacity in the NDR&SS, the NDA&H, and the NDACD, the latter to the extent required to operationalize the SOEs. A wider and more broadly focused capacity building strategy for all of MAF would detract from SoL III's goal, purpose, and component outcomes. In addition, the recommended budget of about A$25.0 million is only sufficient for SoL III to focus on its specific objectives. Under SoL III there will be no resources or budget available for the more generic target of attempting to improve MAF's overall performance as a ministry.

11.7. Working within Government Systems

Separately reported to AusAID and ACIAR.

11.8. Working with Suco Extension Officers

11.8.1. Current situation

The effectiveness of MAF's current cadre of nearly 400 SEOs and senior extension officers is constrained by: (i) inadequate operational and training budgets (currently US$12 per month per person[43] but budgeted for an increase in 2011 to maybe US$30.00 per person per month[44]); and (ii) insufficient technical and extension skills which limits their ability to engage with experienced and risk-averse farmers. However on a more positive note MAF has a pool of staff in the *sucos* which, with adequate and appropriate support and training, could form the basis of an effective national agricultural extension system, particularly if the drafted 'National Agricultural Extension Policy[45]' is enacted.

Various bilateral and NGO rural development programs are working with selected SOEs, depending on their geographic focus. For example GTZ is closely engaged with the SOEs in Bobonaro through RDP III and CARE International works with SOEs for its community-based seed production programs in the same district. In addition it is anticipated that RDP IV will focus on supporting the fledgling national extension program at all levels within MAF – from national extension planning down to *suco*-level implementation. Therefore it is expected that over time the effectiveness of the SOEs and their supporting district and sub-district staff will increase slowly, with the rate of progress being dependent on bilateral support, given that MAF has very limited budget; basically for salaries only– see Section 11.4.

11.8.2. Options for SoL III and recommendations

SoL III's best strategy is probably to work with a wide range of partners and directly with MAF's systems, particularly given the objective of distributing increasingly large quantities of improved seed and planting materials to farmers throughout Timor-Leste. This means that the design of Phase III should not be too prescriptive, but rather leave the choice of "which partner to use where" up to day-to-day Program management. For example in some districts it might be more efficient and effective to use and support NGOs as seed and crop production technology distributors (e.g. CARE) whilst in others it might be more logical to use and support SOEs who have received training and operational support from other bilateral programs, and possibly SoL.

[43] According to the Director of the NDACD some SOEs only receive US$3.00 per month.
[44] The design team considers such a budget increase to be unlikely.
[45] Author – Bryan Gorddard and partly funded by SoL II.

Irrespective of which distribution strategy is used, it will be necessary to support all seed distribution partners with operational funds and technical training. Such a program will be expensive and time-consuming but SoL III will not succeed without this large and all-embracing capacity building effort.

On balance, when the above discussion of options is considered, these options are assessed against the main conclusions from this institutional assessment, and the agreed need to support MAF's fledgling national seed system (which encompasses all aspects of SoL III) is taken into account, the design team recommends: (i) that SoL III uses MAF's internal systems for seed and crop production extension; but (ii) maintains the informal partnerships forged during Phase II in case the SOE-based strategy (and the associated direct funding pilot) fail. If this unfortunate event occurs it will be essential for SoL III's management team to respond quickly and to re-engage with the most important of its Phase II partners.

11.9. Seed Tendering Process

MAF is currently constrained by national procurement rules and guidelines in terms of how they impact on the ministry's ability to directly-purchase foodcrop seed from contract growers. Whenever MAF needs to procure seed the ministry is required to call domestic tenders – it is prohibited from entering into direct-purchase contracts at pre-agreed prices. However SoL II's successful contract seed production operations have been able to by-pass these GoTL regulations, because the Program purchases seed directly using Australian funds. As SoL III expands it will be necessary for MAF to takeover this procurement process, but at present this is not possible because of national procurement rules and guidelines. It will therefore be necessary for SoL III to start to address and resolve this issue.

11.10. Seed Planning and Distribution Decisions

11.10.1. Current situation

Current seed planning and distribution decisions appear to be rather ad-hoc and responsive to short-term crises rather than following agreed short- and longer-term plans, and responding to crises as required. Furthermore it seems that SoL and MAF do not always work in unison, e.g. there are situations where MAF purchases and distributes seed of existing varieties in areas where SoL is distributing seed of new varieties, and where MAF distributes seed irrespective of the need (e.g. in Baucau where in 2010 some farmers received seed of both self-pollinated and hybrid varieties). This situation results, at least in part, from MAF's requirement to achieve distribution targets, but will need to be addressed during SoL III through targeted training in seed production, processing and distribution planning[46].

This uncoordinated approach is not only inefficient in terms of managing the production and distribution of seed; it also has a high opportunity cost as seed of un-improved varieties dilutes the proven impact from improved varieties, i.e. one variety 'under-mines' the other. To some extent this outcome has been unavoidable in the past because SoL has not been able to meet the demand for its improved varieties and this has necessitated the importation (mainly by FAO) of rice and maize seed from Thailand and Indonesia. These varieties do not have the same high yield potential as SoL's improved varieties. The logical solution to this dilemma is for SoL III to

[46] SoL III needs to be cognisant of MAF's longer-term strategic plan which is predicated on the annual distribution of seed to every farmer every year – with fertilizer. It is very doubtful is such as strategy is financially sustainable, but more importantly the SoL III design process has revealed that Timor-Leste does not need huge tonnages of foodcrop seed every year – see Appendix 9 for details on seed requirement projections.

produce sufficient tonnages of improved rice and maize seed to: (i) satisfy a reasonable annual demand from Timor-Leste's farmers; and (ii) allow for the retention of seed for emergencies – droughts, crop failures, etc. Appendix 9 details projected seed demand and supply.

11.10.2. Allocation to cooperating development partners

During SoL II it was necessary to distribute very small quantities of seed of improved foodcrop varieties (as low as 0.2 kg/household) because of the shortage of seed and the need for SoL to cover 17 sub-districts. The distribution of such small quantities of seed did not leave 'any room for error' and, from experience, it became apparent that many farmers were not able to carry forward sufficient seed of improved varieties to be considered as adopters[47]. The exception to this scenario was the distribution of small quantities of seed for OFDTs which are only $25m^2$ in area. However the OFDTs are closely supervised and the probability of success and seed carry-over is therefore higher. It is now clear from SoL II's experience that minimum or thresh-hold quantities of seed and planting materials should be distributed to cooperating farmers if the objective is maximum adoption rates of improved varieties. Suggested minimum quantities ('mini packs') are 5 kg of rice and maize seed, 15 kg of peanut seed, and 100 sweet potato and cassava cuttings and canes, per household (excluding those households directly involved with OFDTs).

11.10.3. Allocations within MAF's systems

There is some evidence that MAF's SEOs can be become effective seed and planing material distributors in sub-districts where SoL has been operating for a few years, e.g. in Aileu where SOEs are aware of SOL's new varieties of sweet potato and are organizing the collection and distribution of cuttings which are grown by farmers who are contracted to SoL. However it has taken four years and considerable SoL support for the SEOs in Aileu in order for this relationship to develop. This is a good example of the capacity building efforts required before sustainable relationships can be built between SoL and MAF's SEOs.

It is accepted that SoL III will have to rely considerably on MAF's SOEs as conduits through which to distribute seed and crop production technology, because of their presence in every *suco* and the longer-term sustainability objectives associated with building the capacity of these staff (but see Section for 11.8 for the budgetary reasons why this approach will be difficult). There is no point in just handing out packages of improved seeds and a list of instructions to the SEOs. They will need technical and extension methodology support, and funds to run demonstrations and field days if they are to be effective. This will require substantial SoL budget allocations in the absence of adequate MAF operational budget, or more support from RDP IV.

The distribution of seed and associated crop production technologies through MAF's SEOs will need to be carefully and planned and resourced on a national basis. This will require close cooperation with a third MAF Directorate (NDACD) which in turn has implications for how SoL III is managed and where the Program is embedded with MAF's structure. The extent to which SoL III is able to directly support such an association will depend on the final Australian budget allocations and the final design of RDP IV - it might be feasible to leverage some RDP IV funds for direct SOE support.

12. Capacity Building Strategy for SoL III

12.1. General Definition of Capacity Building

[47] See 'Three years after OFDTs: farmers adoption rates, dissemination and reasons for dis-adoption' SoL July 2009, for a discussion on the adoption of new foodcrop varieties and seed availability.

Capacity building is the process of developing competencies and capabilities in individuals, groups, organizations, sectors or countries, that leads to sustained and self-generating performance improvement. Capacity building activities are wide-ranging and can include training and development, organizational assessment and development, institutional strengthening and sector/ economic reform.

The key elements of this definition mean that capacity building for MAF under SoL III:

- should include activities that are tailored to the level at which the ministry is operating and to the needs of the target group;
- is unique to the situation for which it is designed - that is, there is no single overall framework or common set of activities;
- must lead to performance improvement for the target group, such as improved service delivery, increased productivity, etc;
- must be sustainable, so that the improved performance continues after the aid-funded activities cease; and
- should also be self-generating to enable the target group to continue to build capacity with little or no aid-funded assistance.

Capacity building within MAF can only succeed with active participation by the target group. This means that aid-funded projects and programs for capacity building should:

- be clearly based on the real needs of the target group;
- recognise that during the project/program, these needs and priorities will change;
- use a facilitative and consultative process that is firmly based on the principles of 'change management'; and
- be sensitive to constraints and demands on the target group that will influence the rate at which capacity building activities can take place.

For SoL III this means that capacity building should, through various dynamic processes, build competencies and organizational arrangements within the scope and purpose of the Program. In the long term, relevant MAF staff and the directorates in which they work should be better-able to plan and implement Timor Leste's national seed system. However, in the first instance this means building the capacity of staff working directly with Sol III, embedding new systems within MAF, and improving MAF's institutional capacity to development and manage a national seed system.

12.2. Capacity Building for Sol III

A capacity building strategy for SoL III must, because of the definition of SoL as a Program, be flexible and non-prescriptive. As was experienced during Phase II, it is inevitable that circumstances will change over the five-year life of Phase III and new demands for capacity building and institutional strengthening will arise. Therefore Section 12 of this appendix provides: (i) guiding principles under which SoL III's capacity building activities should be implemented; and (ii) some general indications of where the overall strategy and component-specific strategies should focus (and the target groups of MAF's staff and the resources needed) given that the end-of Program outcome for Component 4 is: MAF staff being increasingly capable of planning and managing a national seed system.

The details in terms of specific capacity building activities, events, study tours, workshops, training programs, systems development, and institutional strengthening should be determined as part of the annual planning process and take into account progress during the previous year and the need to address issues and constraints which are impacting on progress and success.

Against the recommendation in the above para, it will be important that SoL III does not under-estimate the need for ongoing formal and post-graduate level training in general agricultural research and more specific fields of agronomy and seed production and management (Masters and PhDs). Progress with this aspect of capacity building during Phase II has been reasonable, but there is a need for MAF to have seven Masters Degrees and hopefully some progress towards (say) three PhDs before the ministry can feel confident that it is able to sustainably operate Components 1 and 2.

This point has been reinforced in this appendix because there a 'school of thought' that SoL has spent enough time (and budget) on building scientific capacity in the two key national directorates (NDR&SS and NDA&H). In the opinion of the design team this is not the case, hence the recommendation that SoL's scientific training program (at all levels) be at least maintained during Phase III. It takes at least a generation to build scientific (and in the case of SoL, seed production, management and distribution) skills and experience to sustainable levels, and to-date SoL has only been supporting such programs for seven years[48]. It would be a major error of judgement to assume that MAF has already reached this point in its short institutional development history.

12.3. Guiding Principles

The foregoing institutional analysis and assessment provides many lessons and guidelines on how a capacity building strategy for SoL III might be designed and implemented. In addition, SoL III's objectives (goal and purpose) and budget allocations (Australian and East Timorese) will also significantly influence the scope, scale and focus for the Program's capacity building strategy. Against these general caveats the design team for SoL recommends that the following principles should be used to guide the design and implementation of SoL III's capacity building strategy:

1. Treat the capacity building strategy as a flexible and non-prescriptive program within SoL III – as outlined in Section 12.1.

2. Recognize that many past attempts to build MAF's capacity have not been particularly effective or sustainable (Section 11.6.1). Therefore set realistic and attainable objectives for SoL III's capacity building initiatives. In addition do not rely too heavily on cooperation from DPs as most have their own specific development objectives which are not as tightly focused as SoL's[49].

3. Focus on building MAF's and Timor-Leste's farmers' ability to grow all important foodcrops, not just rice. Progress during Phase II indicates that to a certain extent maize and roots/ tubers are falling behind rice in terms of increased availability of improved seed and planting materials (Section 11.1.1). It will be important for Phase III to address this imbalance.

4. Do not attempt to build capacity across all of MAF – this would be an enormous and expensive task and is well beyond the remit of SoL III. Furthermore RDP IV and possibly other MAF-support programs such as the World Bank's Agricultural Productivity Program (APIP) may be better-suited to work across all of MAF's directorates.

[48] Phase I was very small and operated with very limited budget.
[49] There are notable exceptions to this guideline, e.g. CARE International's community-based seed production programs.

5. The corollary to the first guideline is to focus SoL III's capacity building efforts and resources on those parts of MAF whose efficient operation is essential for the success of Phase III –the establishment of an efficient and sustainable national seed system. MAF's budgetary limitations (at least in the short-term) are also likely to limit the breadth of SoL III's capacity building focus.

6. Recognize the implications of GoTL's decentralization agenda – i.e. design and implement capacity building activities which include MAF's district and sub-district staff with the objective of long-term sustainability.

7. Packaged capacity building efforts with real and practical examples in the field – in the past too much of MAF's capacity building efforts have been too theoretical ('capacity building for the sake of building capacity') and not implemented as part of a 'deliverable product' at farm level.

8. Build on the capacity which was built during SoL II – particularly in terms of strengthening NDR&SS's ability to design, implement, and analyze crop variety evaluation trials and on-farm demonstrations, and to release new varieties.

9. Pick winners and focus human resources and budget on targets (particularly SEOs) with a reasonable probability of success, e.g. build on CARE International's community seed production and distribution programs, and work in districts where other bilateral programs are also providing support to SEOs.

10. Recognize that even within SoL's sphere of influence there are numerous disciplines and skills which need to be strengthened. The list of component outputs in SoL's strategic framework is a good example of the breadth of capacity building which will be required for Phase III.

12.4. Phase III Capacity Building Objectives

12.4.1. Overall Objective

SoL's overall capacity building objective for Phase III should be to strengthen and embed the skills, systems and institutional capacity required for the successful and sustainable operation of a national foodcrop variety testing and seed management and distribution system within MAF. Achievement of this objective would contribute to the achievement of SoL III's purpose and goal – by providing farmers with access to improved foodcrop varieties it should be possible to improve food security through increased productivity of Timor-Leste's major foodcrops.

12.4.2. Specific Objectives

More specifically, SoL III's capacity building objectives relate directly to the objectives for the four deliverable components. These are:

1. Component 1: Improved varieties of foodcrops identified and released – SoL's 'engine room';
2. Component 2: Sufficient high quality seed (being) produced through formal channels to maintain the genetic quality of released varieties;
3. Component 3: Mechanisms for the production and distribution of seed through informal and market channels strengthened; and
4. Component 4: MAF's capacity to manage the national seed system strengthened.

12.5. Capacity Building Matrix

12.5.1. Scope and focus

Table 5 provides a matrix of core skills, systems and institutional capacity which the design team has identified as being required for a sustainable foodcrop seed system in Timor-Leste. The table has three main parts: (i) capacity building for MAF's staff; (ii) building a national seed system within MAF; and (iii) developing MAF's institutional capacity to manage a national seed system and provided foodcrop production support to Timor-Leste's farming communities. This listing indicates the recommended scope and focus for SoL III's capacity building focus – within MAF and across those areas/ disciplines which needed to be strengthened if SoL III is to be sustainable in the longer-term.

Table 5 also lists: (i) the MAF staff positions (and staff numbers) in SoL III's four deliverable components and the management component; (ii) the core skills required; (iii) an estimated current core skill rating; (iv) targeted end-of-Program outcomes (EoPOs) (skills, systems and institutional capacity; (iv) the activities/ programs/ events needed over the life of SoL III to achieve the EoPOs; (v) criteria by which to measure progress; and (vi) any risks/ issues related to the activities/ programs/ events for SoL III's deliverable components and the Program Management Unit. Budgets for these capacity building programs are detailed in Appendix 6.

12.5.2. Participant and directorate selection – capacity building boundaries

Experience indicates that any form of capacity building provided by SoL is in considerable demand from within and outside MAF. For example, English and mathematics/ statistics training courses are always in demand from staff from all of MAF's directorates, and from staff from NGOs and cooperating DPs. Such demand means that during Phase III it will be necessary to restrict the capacity building audience to a size which can be accommodated within SoL III's budget. It is not intended that SoL III should morph into a capacity building exercise for all of MAF's directorates or for the numerous partners who are also assisting with the development of Timor-Leste's agricultural sector. This is a far larger task than that which can be undertaken by SoL III and it really needs to be a separate and stand-alone national program, as suggested in the World Bank's paper on an Agricultural Productivity Improvement Program. Accordingly SoL III's capacity building scope and scale will be restricted to that required for MAF to be able to progressively implement SoL III's four deliverable components without technical assistance and with sufficient GoTL budget to be fully operational – this can be considered as the capacity building boundary.

Table 3 shows that SoL III's partner directorates (NDA&H, NDR&SS and NDACD) have a total of about 700 staff (2009 figures); 155 in Dili and 544 in the districts. In addition MAF has about 80 staff working in the 13 district and sub-district offices. This means that the potential capacity building target for SoL III could be large as about 800 people when the additional 24 SEOs to be appointed in 2010 are included. Such a target size is quite unrealistic and therefore it will be necessary for SoL III's implementation team and the Program Management Unit to rationalize the capacity building target down to a manageable size, using the criteria of 'must have a certain set of skills and must have an operable system' if SoL is to be successful and sustainable'. As mentioned in Section 12.5.2, it will be impossible for SoL III to build capacity throughout its three key partner directorates, let alone all of MAF, and so careful participant selection will be important.

Appendix 2: Institutional Assessment

Component 1: Evaluation of improved foodcrop varieties			
Outcome: Improved varieties of foodcrops identified and released			
Timor-Leste staff (positions & numbers): On-station Research Officers (11), Regional Coordinators (3), OFDT Officers (17), OFDT Coordinators (4), Pure Seed Officers (3)			
Relevant MAF Directorate: NDR&SS			
Key Outputs	**Core Skills**	**Systems**	**Intuitional Capacity (IC)**
1. Establishment (and operation) of Agricultural Research Centres and Stations completed.	➢ Selection/ construction/ set-up and management of Research Centres and Stations ➢ Centre and station staff management ➢ Operation, repairs/ maintenance of Centres/ Station buildings and equipment	➢ Procurement/ asset management/ investment records	➢ Management of MAF land and assets ➢ Aware of importance of continued adaptive research into new foodcrops, new foodcrop production systems, etc. ➢ MAF able to present logical, rational and budgeted cases to Ministry of Finance for additional GoTL budget for foodcrop research, seed production, and seed/ crop production extension (see IC for component 5)
2. Genetic material of potential improved varieties identified and sourced.	➢ Aware of sources ➢ Recognize need for wide range of foodcrop varieties ➢ Aware of Timor-Leste's diverse farming systems		➢ Ability to maintain International networks
3. Potential new varieties evaluated on-station	➢ Planning and implemented replicated adaptive research trials ➢ Agronomy, farming systems research and statistical analysis techniques ➢ Knowledge of soils, plant diseases and pests ➢ Aware of possible impact of climate change and implications for adaptive foodcrop research in Timor-Leste ➢ Able to organize and run on-centre and – station field days	➢ Recording/ storing/ publishing research station/ centre results, good data-base system	➢ Understand importance of testing foodcrop varieties across all agro-ecological zones in Timor-Leste

Table 5: SoL III Core Skills, Systems and Institutional Capacity Building Matrix

4. Potential new varieties evaluated on-farm	➢ Working with groups of farmers ➢ Planning and running multi-variety OFDTs ➢ Collecting, analyzing, reporting and interpreting OFDT results, including statistical analysis	➢ Recording/ storing/ publishing research on-farm testing results, good data-base system	➢ Understand importance of non-yield variety selection criteria – storage, taste, post-harvest labour needs, etc.
5. Selected new varieties officially released.	➢ Understanding variety release protocols	➢ Varietal approval and release system established and operational	
6. Sufficient basic and foundation seed being produced.	➢ Determining national requirements of basic and foundation seed ➢ Seed production techniques – maintaining purity, quality systems, etc. ➢ Understands quality requirements – weeds, seed-born diseases, etc.	➢ System which links seed flows from component 1 into bulk-up and distribution through components 2 and 3	➢ Understand seed flows – from basic/ foundation through formal to formal ➢ Recognize the importance of a national seed system in terms of planning and providing sufficient high quality seed to maintain varietal purity and meet farmers' demands
Current Skill, System and IC Scores:	➢ Reasonable, SoL I and II made good progress in terms of developing these skills. Rating (4/5)	➢ Reasonable, SoL I and II made reasonable progress in terms of developing these systems. Rating (3/5)	➢ Some, SoL II made some progress in terms of developing this capacity, with the exception of the third dot point (presenting logical, rational and budgeted cases to Ministry of Finance for additional GoTL budget). Rating (2/5)
End-of-Program Outcomes:	➢ National network of Research Stations and smaller Research Posts established, sufficient to cover major crop types and agroecological zones ➢ 10-15 new varieties of foodcrops evaluated and officially released ➢ MAF competently managing all phases of the research cycle including objective setting, planning and implementation of trials, analysis, and reporting	➢ Formalized system within NDR&SS to record all adaptive foodcrops research data generated on- and off-centre and station ➢ Seed recording system to keep track of seed flows from stations to contract seed growers	➢ MAF (NDR&SS) has the capacity, information, data and analytical experience to be able to mount credible submissions to Ministry of Finance for increased GoTL budget for basic foodcrop research
Capacity Building Actions:	➢ Post-graduate studies; masters and PhDs ➢ Over-seas study tours to visit similar foodcrop variety testing stations, etc. ➢ In-country formal and informal training courses – including English, agronomy, soils, plant breeding, statistics, etc. ➢ Daily on-the-job training	➢ Assist with development of recording systems (could be part of current work on research policy) ➢ Assist with development of seed recording and mapping system – see component 4	➢ Assist MAF (policy and planning directorate) to prepare budget submission papers through provision of arguments and impact assessment/ predictions in terms of incremental food production generated by programs such as SoL; and calculations of incremental costs (per Mt of food), and returns to public sector investment in foodcrop production in Timor-Leste

Appendix 2: Institutional Assessment

Actions Implemented by:	➢ International agricultural education institutions ➢ Component 1 RA, with some assistance from APC ➢ In-country trainers (language, mathematical and statistical skills)	➢ Component 1 RA, with assistance from APC ➢ Suppliers of propriety software (for research record keeping and seed system management) – for component 4 too ➢ Overseas trainers – when staff are on study tours	➢ SoLTL, with assistance from TA team (for collection of data and information to support submissions) ➢ Other DPs assisting MAF with agricultural development
Progress Measurement:	➢ Improved and more consistent quality research results from research centres and stations – measured through competency-based self-assessment techniques ➢ Director of NDR&SS running three research centres and three research stations without foreign assistance	➢ SoL III using adaptive research results and seed management systems, to guide annual planning process	➢ Adequate annual budgets available for the operation and maintenance of three research centres and three research stations
Hand-over time-frame:	➢ By the end of SoL III, MAF and the NDR&SS should be capable of funding and operating all activities associate with component 1		
Major Risks/Issues:	➢ MAF is unable to identify and purchase/ lease suitable land for three additional research stations ➢ MAF is unable to second additional research and seed production staff to SoL III	➢ Systems not established and therefore research and seed planning are not based on sound logic and outcomes from SoL III's adaptive research programs	➢ MAF unable to convince the Ministry of Finance of the importance of additional operating budget for the nation's only functional research stations, and on which future increased food production for a rapidly-growing population is based

Component 2: Formal seed production and distribution			
Outcome: Sufficient high quality seed being produced through formal channels to maintain the genetic quality of released varieties			
Timor-Leste staff (positions & numbers): Seed Production Coordinator (1), Seed Production Officer (12), Regional Coordinator (3), *Suco* Extension Officers (80% of 400 = 320)			
Relevant MAF Directorate: NDAFC and NDACD			
Key Outputs	**Core Skills**	**Systems**	**Intuitional Capacity (IC)**
1. Formal seed being produced through farmer contracts.	➢ Able to organize MAF contracts with contract seed producers ➢ Knowledge of on-farm quality control requirements for quality formal seed production ➢ Able to supervise all stages of seed production process, from planting through to harvest and seed collection	➢ Seed contract recording and management	➢ Able to maintain and operate numerous contracts with seed producers across the country using seed contract and recording system
2. Quality assurance systems established.	➢ Understand importance of QA systems and implications for system break-downs ➢ Able to relate importance of QA systems to seed production contractors ➢ Able to deal with QA issues as they arise during seed production process, and to assist contracted farmers to respond	➢ Seed QA system	➢ Able to implement seed QA system
3. Technical extension support provided to contracted seed producers.	➢ Understand agronomic features of improved varieties ➢ Able to introduce new varieties to contract seed growers ➢ Able to monitor seeds crops throughout cropping cycle ➢ Able to advise contract growers on production for high seed yields – use of fertilizer, roguing, harvest times, etc.	➢ SOE extension organization, planning and monitoring system	➢ Able to organize and implement national formal seed production using contracted private sector seed growers
4. Seed grading, packing and storage facilities established.	➢ Able to organize seed harvest and collection from numerous contract seed growers ➢ Able to organize and operate seed cleaning, grading, packaging and storage in seed processing units – in store QA ➢ Able to conduct seed moisture tests (dry if necessary) seed germination tests, etc. ➢ Able to operate and maintain seed	➢ Seed management system – from contract grower to recipients	➢ Able to operate seed management system

	processing equipment ➢ Able to maintain seed production and processing records – lot management, inventories, labelling, dates in-out, etc.		
5. Formal seed distributed through preferred distribution channels.	➢ Seed planning – deciding quantities and where to distribute formal seed – through SEOs and CSPGs, and DPs ➢ Establishing paper trail of seed distribution figures ➢ Organizing seed distribution from Seed Processing Centres to recipients	➢ Ditto	➢ ditto
Current Skill, System and IC Scores:	➢ Good, but small scale – SoL II made good progress with component 2, and established good examples of how to contract with seed growers; and collect, process, package and distribute seed. Rating (4/5)	➢ Reasonable, informal (SoL II) records are good, but not institutionalized into a national system within NDA&H. Rating (3/5)	➢ Reasonable, but seed national seed planning and coordination tends to be *ad hoc* in response to crises rather than longer-term planning for a sustainable formal seed production system ➢ Some 'conflict' between MAF's approach to seed production and distribution and that recommended for SoL III, in terms of quantities, locations, costs and efficiency. Rating (2/5)
End-of-Program Outcomes:	➢ Four Seed Processing Centres established (2 new) for receiving, grading, drying, storing, and packing formal seed, with a combined capacity of approximately 175 Mt per year ➢ Production of 100 Mt of formal maize seed, 50 Mt of rice seed, 25 Mt of peanut seed, 600,000 sweet potato cuttings, and 600,000 cassava canes per year ➢ Formal seed and planting material effectively and efficiently distributed to CSPGs and farmers ➢ MAF competently managing the production and processing of targeted quantities of formal seed, and the effective distribution of this seed to farmers and CSPGs	➢ National seed production and management system fully operational	➢ NDA&H able to manage national seed production system, interpret outputs, and respond in terms of decisions on seed quantity, quality, production and processing sites, distribution targets and volumes, and distribution mechanisms

Capacity Building Actions:	➢ Range of short courses (1 week) in field management of seed crops, assessing and controlling seed quality (genetic and phyto-sanitary), storage management, equipment O&M, and seed planning and inventory management ➢ On-the-job training at seed production/ processing sites within Timor-Leste and Indonesia, up to 2 months ➢ Post-graduate studies in Australia and/ or Indonesia.	➢ Assist with the development of a national seed system – linked with component 4	➢ Short courses for management staff from NDA&H to build skills required for seed industry management – linked with component 4
Actions Implemented by:	➢ Formal Seed Production Advisor and Regional Advisors (3) - (short courses) ➢ International seed production centres and businesses (private and public) ➢ International universities and colleges specializing in seed crop agronomy and seed production	➢ Formal Seed Production Advisor and suppliers of proprietary seed system management software	➢ Formal Seed Production Advisor and suppliers of proprietary seed system management software
Progress Measurement:	➢ Increased tonnages of informal seed produced (Program records) ➢ Improved seed production staff in range of skills listed above – measured through competency-based self-assessment techniques ➢ MAF NDA&H staff planning and implementing component 2 without assistance ➢ Director of NDA&H supervising a national contract seed production business	➢ More reliable and accurate information and data on formal seed production and distribution in Timor-Leste	➢ Staff from NDA&H running national seed systems software and using outputs to guide decisions on seed production and distribution plans
Hand-over time-frame:	➢ By the end of SoL III, MAF and NDA&H should be capable of funding and operating all activities associate with component 2		
Major Risks/Issues:	➢ Conflict between the time needed to build staff skills (and time away from SoL III positions during training) and pressure for substantial increase in formal seed production (as outlined in SoL III design)	➢ NDA&H elects to continue with current 'informal and *ad hoc* ' seed management system, rather than building/ purchasing a proprietary system	➢ NDA&H continues to use current *ad hoc* approach to national seed planning and distribution, and responding to seed crises in ways which can jeopardize and under-mine the predicted impact of SoL III

Component 3: Informal seed production and distribution			
Outcome: Mechanisms for the production and distribution of seed through informal and market channels strengthened			
Timor-Leste staff (positions & numbers): Regional Coordinator (3), Community-Based Seed Production Coordinator (1), *Suco* Extension Officers (80% of 400 = 320)			
Relevant MAF Directorate: NDA&H, NDACD			
Key Outputs	**Core Skills**	**Systems**	**Intuitional Capacity (IC)**
1. Community Seed Production Groups (CSPGs) established.	➢ Identification/ formation of seed production farmer groups, including women's seed production groups (use of existing groups if possible) ➢ Group management/ dynamics/ dispute resolution skills ➢ Simple informal seed production techniques; planting; weed control; crop purity; seed harvesting/ drying; processing and storage	➢ Community seed production and marketing groups recording system: names/ numbers, seed distributed, seed produced, issues/ problems, etc., part of the national seed management system	➢ Able to operate community seed production and marketing groups recording system – part of the national seed management system
2. Farmer Seed Marketing Groups (FSMGs) established.	➢ Formation of farmer seed marketing groups, including women's seed marketing groups ➢ Group management/ dynamics/ dispute resolution skills ➢ Simple seed packaging and storage systems, including QA ➢ Simple informal seed marketing techniques; demand and supply; location of seed deficits; local of surpluses; demand for quality seed; tonnages sold/ distributed; etc.	➢ Ditto	➢ ditto
3. Focal seed merchants in local markets established.	➢ Identification of suitable candidates for support as commercial seed merchants ➢ Maintenance of simple seed merchant recording system ➢ Observation/ recording market-level activities; volumes, purchasers, destinations, etc.	➢ Simple seed merchant recording system – names, business location, support provided, expected and achieved results – part of the national seed management system	➢ An appreciation of the roles and functions of private sector seed merchants in a mature seed system
4. Access to seed for vulnerable groups improved, e.g. through vouchers and seed fairs.	➢ Identification of and engagement with vulnerable groups, particularly WHHs and marginalized upland farmers ➢ Setting up voucher systems for distribution	➢ Voucher, and financial management and recording system – part of the national seed management system	➢ An appreciation of the impact which a seed voucher and seed fair system can have on vulnerable groups, especially after a climatic disaster

	of seed to vulnerable groups at seed fairs ➢ Location, organization and monitoring of seed fairs		
5. Systems linking informal seed producers with potential buyers developed.	➢ Basic marketing skills – demand, supply, pricing, and value determination; surpluses and local over-supplies; product re-distribution to avoid low prices; advertising/ awareness raising, etc.	➢ Part of the national seed management system	➢ An appreciation of the roles and function of private sector seed merchants in a mature seed system
Current Skill, System and IC Scores:	➢ Very limited, with exception of Care International's experience with 300 CSPGs and (in 2010) an unspecified number of FSMGs. No skills within MAF. Rating (1/5)	➢ No system within MAF, simple system currently operated by Care International – may be possible to build on this as basis for part of the national see management system. Rating (1/5)	➢ NDA&H staff have very limited knowledge and understanding of how markets for agricultural inputs (including seed) work and function (understandable because of GoTL strategy of handing out all production inputs free of charge). Rating (1/5)
End-of-Program Outcomes:	➢ About 1,000 CSPGs established and producing a marketable surplus of informal seed ➢ CSPGs linked with market outlets and selling seed, as FSMGs ➢ Mechanisms for strengthening market-based exchange of informal seed trailed, evaluated, and where appropriate replicated	➢ Informal seed recording and management system – part of a national seed management system	➢ MAF staff better-informed and more aware of how informal seed production and distribution systems work and function in a market-based economy, and one which includes active involvement of the private sector
Capacity Building Actions:	➢ Short in-country and on-the-job training in: group establishment, gender implications for seed producing and marketing groups; group dynamics and monitoring/ recording; seed value chains; simple seed production, processing, storage and marketing; and principles of market development	➢ Build informal seed recording and management system – part of the national seed management system	➢ Aware of how seed production and marketing works and functions under a private sector system; efficiency of such systems; and relative costs of seed production under public and private sector systems
Actions Implemented by:	➢ Informal Seed Production Advisor, Farmer Group Specialist (ST), Seed Value Chain Specialist (ST), Regional Advisors (3)	➢ Informal Seed Production Advisor, Farmer Group Specialist (ST), and Seed Value Chain Specialist (ST)	➢ Informal Seed Production Advisor, Farmer Group Specialist (ST), and Seed Value Chain Specialist (ST)
Progress Measurement:	➢ Number of CSPGs, FSMGs and commercial seed merchants established and operating independently by end of Phase III ➢ Volumes of seed being produced and sold by CSPGs, FSMGs and commercial seed merchants	➢ Reliable records on volumes of seed being produced and marketed by CSPGs, FSMGs, and commercial seed merchants	➢ Improved understanding of how commercial seed production and marketing works and functions under a private sector system – measured by progressive change in MAF staff's attitude to likely success of component 3

	➢ Simple technical and financial audits of CSPGs, FSMGs and commercial seed merchants – to test technical and financial viability ➢ Results/ impacts/ outcomes from seed fairs and seed voucher system		
Hand-over time-frame:	➢ MAF and the slowly emerging commercial seed sector are likely to require ongoing assistance with informal seed production and distribution		
Major Risks/Issues:	➢ Note: the success of SoL III is not predicated on the success of this component, which is considered to be a pilot to test the feasibility of supporting the development of the private sector's involvement in Timor-Leste's seed industry ➢ However, the success of outputs 1 and 2 will eventually determine if MAF accepts the logic of reducing formal seed production under component 2, and begins to rely to a greater extent on the private sector to supply adequate quantities of informal seed to food producers	➢	➢ Reluctance within MAF to accept the roles of Timor-Leste's private sector in the nation's foodcrop seed business, and the need for less (not greater) expenditure on public sector seed production.

Component 4: Seed management system			
Outcome: MAF capacity to manage the national seed system strengthened			
Timor-Leste staff (positions & numbers): Long-term SOSEK Staff (4), Gender Officer (1), National Program Manager (1)			
Relevant MAF Directorate: NDA&H, NDACD			
Key Outputs	**Core Skills**	**Systems**	**Intuitional Capacity (IC)**
1. Seed planning and management systems established.	➢ Knowledge of what a national seed system entails ➢ Ability to design/ plan a national seed planning and management system: (i) supply-side: production planning, contract management and inventory control, and managing information on informal seed production; (ii) demand side: requests for seed, definition of priority users and areas, and distribution planning	➢ Proprietary (or SoL-designed) seed planning and distribution system, including seed allocation procedures and inventory management	➢ Able to operate and maintain a national seed system once established
2. M&E / SOSEK processes strengthened.	➢ Sample and questionnaire design ➢ Data analysis (including qualitative and quantitative, and use of IT packages ➢ Report writing – including evidence-based arguments ➢ English language ➢ M&E systems	➢ SoL's M&E/ SOSEK system embedded in MAF's ministry-level M&E system (in National Directorate of Policy and Planning)	➢ Ability to incorporate program-specific M&E systems into national (ministry-level) system
3. GoTL seed policy being informed by SoL experience.	➢ Outcome analysis – assessment of impact of SoL's varieties on food production, and calculation of foodcrop seed requirements ➢ Identification of policy issues, seed policy formation skills, and reporting to higher-level GoTL officials	➢ M&E system informing SoL of adoption rates of improved foodcrop varieties, and impact on national food production	➢ Ability to operate M&E system - report on adoption rates for improved foodcrop varieties, and impact on national food production
4. Seed system gender strategy implemented.	➢ Gender awareness-raising and advocacy; and strengthening commitment and leadership for gender equality ➢ Promoting gender-sensitive research, data collection, analysis and dissemination of sex/ gender disaggregated data ➢ Strengthening institutional and technical capacity for gender mainstreaming ➢ Promoting women's access, participation	➢ M&E system (appropriately structured) informing SoL of: (i) impact of its gender strategy; and (ii) need for additional gender awareness raising	➢ Key national directorate (R&SS, A&H and ACD) aware of: (i) roles of women in food production systems; (ii) social and nutritional impact of equitable distribution of seed of SoL's improved foodcrop varieties

Appendix 2: Institutional Assessment

	and leadership in decision making ➢ Promoting women's access to agricultural inputs (seeds), extension services, information and technology ➢ Working with men to promote gender equality and women's empowerment in seed production, distribution and management.		
5. Improved-variety technical and promotional materials developed.	➢ Production of high quality technical and promotional materials, including brochures, posters, calendars, and banners	➢	➢ Aware of importance of seed/ variety promotional activities, and impact on variety adoption and increased food production
6. Awareness of improved varieties increased though use of mass media.	➢ Able to develop strategies to further promote SoL varieties using mass media such as radio, text messaging, and television	➢	➢ Aware of importance of promoting success of SoL to key GoTL ministries, with objective of successful lobbying/ arguing for more operational funds for MAF
7. Environmental and climate change impacts addressed.	➢ Use of multi-year OFDT yield data to correlate with local climate data ➢ Field-based assessment of impacts of climate change on foodcrop production ➢ Identification of varieties which are suited to increased/ decreased rainfall ➢ Crop yields and food security projections	➢ Analytical systems for prediction of impact of climate change	➢ Aware that climate change/ rainfall variations have the potential to radically influence/ change foodcrop production in Timor-Leste
Current Skill, System and IC Scores (1-5):	➢ Varies between outputs, with 2, 5 and 7 reasonable, whilst others are minimal. Rating (2/5)	➢ SoL's M&E/ SOSEK system is functioning well, but needs to be embedded within MAF and include system to monitor impact of gender strategy. Rating (3/5) ➢ Other systems, particularly national seed system are non-existent. Rating (0/5) ➢ Good start made on use of analytical systems to predict impact of climate change. Rating (3/5)	➢ Currently very little capacity within MAF to operate systems need for component 4, particularly national seed management and gender monitoring systems. Rating (1/5) ➢ Reasonable capacity for outputs 5 and 6. Rating (2/5)
End-of-Program Outcomes:	➢ National seed planning, allocation and inventory control systems established ➢ M&E/ SOSEK unit competently managing field evaluation activities, providing a sufficient basis for progressive learning ➢ Policy issues identified and advice provided on key issues related to development of the national seed system ➢ Gender issues reflected in the	➢ Key systems (national seed and gender) operational and informing MAF policy and SoL planning	➢ MAF able to operate and manage national seed and Program M&E system

	implementation of the national seed system. ➢ Widespread awareness of SoL varieties in all districts ➢ Improved varieties and management practices being identified taking into consideration projected climate change impacts		
Capacity Building Actions:	➢ Training NDA&H staff in designing and operating a national seed planning and management system ➢ Training of M&E/ SOSEK unit staff in social research methods and analysis, and reporting of results ➢ Training in factors influencing seed national seed policy, and policy development ➢ Training in all aspects of the Program's gender policy ➢ Training in production and use of technical and promotional materials, and use of mass media to raise Program and seed variety awareness ➢ Training in understanding and predicting possible impacts from climate change ➢ All training in the form of on-the-job, short in-country courses, and study tours to relevant projects and countries	➢ Assistance with development/ identification of proprietary national seed management system which is suitable for Timor-Leste ➢ Assistance with further development and embedding of SoL's M&E/ SOSEK system	➢ In-house training/ awareness raising courses to promote importance and use of a national seed system ➢ In-house training/ awareness raising courses to promote use of M&E/SOSEK to guide use of a national seed system
Actions Implemented by:	➢ Formal Seed Production Advisor, SoL Team Leader, M&E/ SOSEK Advisor, M&E Specialist, Gender Specialist, Climate Change Advisor, Environmental Specialist	➢ Formal Seed Production Advisor, SoL Team Leader, M&E/ SOSEK Advisor, M&E Specialist, Gender Specialist, Climate Change Advisor	➢ Formal Seed Production Advisor, SoL Team Leader, M&E/ SOSEK Advisor, M&E Specialist, Gender Specialist, Climate Change Advisor
Hand-over time-frame:	➢ MAF is likely to require ongoing assistance with the development, management and application/ use of a national seed system beyond the life of SoL III		
Progress Measurement:	➢ Wide range of improved skills associated with 7 listed outputs – measured through competency-based self-assessment techniques	➢ National seed M&E/ SOSEK systems progressively designed/ upgraded, and used to drive seed production and distribution decisions	➢ National seed system informing and influencing decisions on all aspects of seed production and distribution in Timor-Leste; commencing from a zero base
Major Risks/Issues:	➢ Importance of seed system gender strategy not accepted by MAF	➢	➢ MAF elects to continue to use current informal seed management system

Program coordination and management			
Outcome: PMU functional efficiently and effectively			
Timor-Leste staff (positions & numbers): National Program Manager, Directors and Heads of Divisions of NDR&SS, NDA&H, and NDACD			
Relevant MAF Directorate: NDR&SS, NDA&H, and NDACD			
	Core Skills	**Systems**	**Intuitional Capacity (IC)**
No specific outputs	➢ Annual Program planning ➢ Financial planning, recording and reporting ➢ Progress report preparation and presentation ➢ Technical report preparation and presentation ➢ Writing and publishing scientific articles and reports ➢ Work programming and resource allocation ➢ Data and information management ➢ PMU management – time, personnel, meeting and transport management; staff development, staff career paths, staff counselling, etc.	➢ Financial management and reporting systems ➢ M&E reporting results/ impact/ issues, supported with data management and recording systems ➢ Office management systems and procedures	1. **Program-level**: capacity to manage the implementation and monitoring a A$25 million national program (SoL III) 2. **Generic**: improved capacity at ministerial level to participate effectively in (promote/argue the case for more GoTL budget for agricultural development in Timor-Leste) council of ministers, national development planning, inter-ministerial working groups, sector investment committees, and sector strategic planning committees. 3. **Generic**: improved capacity at national directorates level to implement/ participate in: harmonization meetings with DPs, directorate co-ordination meetings, joint annual planning meetings, consolidation of district plans, national M&E plans, public counselling, and task forces. 4. **Generic: i**mproved capacity at district/ sub-district level to run/participate: district coordination committee (pilot), district disaster management committee, joint annual planning meetings, sector planning and coordination, consolidation of local demands, NGO harmonization meetings, district M&E systems, and food security planning. 5. **Generic: i**mproved capacity at *suco* and local level to prepare: *suco* and *aldeia* development plans (pilot), interest and user-group plans (agricultural extension and irrigation), and community-based organizations and associations plans (pilot).
Current Skill, System and IC Scores (1-5)	➢ Good progress in some areas achieved during SoL II, report preparation and presentation, technical report preparation and presentation, and writing and publishing scientific articles and reports. Rating (4/5) ➢ Other skills still lacking in work	➢ Limited progress during SoL II (except that SoL II used a satisfactory internal financial reporting system) ➢ All systems will need to be improved considerably during Phase III. Rating (2/5)	➢ MAF's capacity to undertake the above-listed tasks continues to be constrained ➢ **However it is beyond SoL to address the first and second dot points (important as they are)** ➢ Phase III will rely heavily on the ability of MAF's NDACD's SEOs to distribute seed and work with farmers and farmer groups, and therefore it will be

	programming and resource allocation, data and information management, and PMU management. Rating (2/5)		essential for SoL III to improve MAF's capacity at the national directorate, district/ sub-district, and *suco*/ *aldeia* levels. Rating (2/5)
End-of-Program Outcomes:	➢ PMU and relevant national directorates able to implement national programs (such as SoL) efficiently, and achieve and report planned impacts	➢ Required systems in place for MAF and its relevant national directorates to be able to implement and report on national programs such as SoL	➢ Three key SoL III national directorates functioning efficiently (in terms of their roles in SoL) and able to complete tasks listed the three last dot points so that SoL III can be implemented according to plan
Capacity Building Actions:	➢ On-the-job training in above-listed skills ➢ Short courses (in-country) on above-listed topics ➢ One (1) international study tour to inspect similar program's management systems, probably Indonesia	➢ Build required systems as part of day-to-day Program implementation (on-the-job training) ➢ Short course in systems design and operation (in-country) ➢ Participate in study tour listed under skills development	➢ Work side-by-side with directors of three key MAF national directorates and MAF's district directors, on last three dot points, but only in terms of the capacity needed to implement SoL III ➢ Short course (inc-country) for MAF staff responsible for last three dot points ➢ Participate in study tour listed under skills development
Actions Implemented by:	➢ SoLTL, and in-country trainers	➢ SoLTL, and in-country trainers	➢ SoLTL, and in-country trainers
Progress Measurement:	➢ Quality and timeliness of all types of reporting ➢ PMU atmosphere and work ethics	➢ Systems operating effectively and delivering information/ data/ reports on time	➢ SoL III able to use MAF's national, district/ sub-district and *suco*-level planning and coordination procedures for the delivery of seed and foodcrop technology to farmers
Hand-over time-frame:	➢ It is expected that MAF will continue to need some support after SoL III – possibly in the areas of: (i) adapting food-cropping varieties and systems to climate change; (ii) more difficult selection of next generation foodcrop varieties once the 'quick wins' from SoL II and III have been adopted; (iii) closer involvement of the private sector in Timor-Leste's seed systems; and (iv) use of investment analysis to guide preparation of annual budgets submissions		
Major Risks/Issues:	➢ The working relationships between MAF and SoL will need to change if SoL III is to be implemented effectively, hence the recommendation for a PMU. There is a risk that if the component objective is not achieved SoL III may fail to become a nation-wide Program.	➢ If the quality and effectiveness of these systems does not improve, SoL III will not be implemented efficiently, nor achieve the objective of becoming further embedded within MAF and its systems	➢ It will be essential that MAF, its national directorates, and its district/ sub-district/ *suco* systems are able to organize the distribution of seed to farmers through these channels. If this process proves to be un-workable, then SoL III will have to revert to the former strategy of using cooperative development partners, NGOs, etc., for seed distribution ➢ In summary, development of MAF's capacity to implement SoL III through its existing organizational structure will be essential for SOL III to succeed as planned

APPENDIX 3

DRAFT GENDER STRATEGY

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1. INTRODUCTION

Since its independence, the GoTL has been committed to the promotion of gender equality in all aspects of the lives of its population as stipulated in the National Constitution. The achievement of gender equality and the improvement of the life status of women, men and children, especially those who live in poor conditions in rural areas has increasingly been a focus of the GoTL and its development partners.

As one of the poorest countries in the world, more than 50% of Timorese people live below the poverty line, earning only around $0.88 per day (World Bank, 2008). The majority of the poor (75%) live in rural areas, relying on agriculture, forestry, and fisheries for their livelihoods and main source of income and employment.

Rural women and men play important roles in agricultural production, food security and rural development of the country. However, as farmers, women and men have faced a number of constraints and challenges to improve their living conditions through agricultural activities. Their access to farming and agricultural inputs and infrastructure, such as high quality seeds and food crop varieties, agricultural extension techniques, roads, markets, access to credit & new agricultural technology, tools and equipment, training and information is limited. These limited circumstances have implications on the Timorese farming system, food supply and security. It is estimated that around one third of rural households exclusively rely on subsistence agriculture, particularly on rice and maize, with low productivity farming techniques they are highly vulnerable to food shortages.

Inadequate food supplies and poor food consumption have accounted for a negative impact on the nutritional status of Timorese people, especially women and children. It is recorded that the malnutrition rate in the country is one of the highest in the world. Around 28% of women suffer from malnutrition and 7% of them are severely malnourished and in need of treatment (ADB, 2005). Among children under 5 years old, two-thirds of them are underweight and 14% severely underweight (The World Bank, 2008).

To address these issues, together with its development partners, including AusAid, the GoTL has strongly emphasized the need to improve food security, agricultural production, and nutritional status as reflected in its 2009 and 2010 National Priorities.

In alignment with the Timor-Leste development policy and National Priorities, AusAid has assisted the GoTL in improving food security and agriculture productivity. This has been done among others by introducing improved food crop varieties and seed multiplication and distribution of released varieties through its program on Seeds of Life (SoL) I and II, starting since 2001.

Given the importance of gender dimensions and implications around the issues of food security, and the vital role women play in agriculture and seed production related activities, the GoTL and AusAid have emphasized the need to continue to focus on supporting gender equality and women's empowerment in all aspects of SoL III program and activities.

The seed system gender strategy is developed based on achievements and lessons learned as well as challenges, opportunities and progresses in the previous years. It provides direction and strategic framework along with concrete actions including management directions for the inclusion of gender equality and women's empowerment issues and cross-cutting issue in all program components of SoL III.

Overall, the seed system gender strategy reflects the commitment and accountability of GoTL and AusAid for the achievement of Millennium Development Goals (MDGs).

2. PRESENT SITUATION

2.1. Gender Situation in Rural Areas in Timor-Leste

More than 80% of the population in Timor-Leste and 94% of the population in rural areas (villages) depend on agriculture for their livelihood. Subsistence agriculture, including crop and livestock activities, fisheries and forestry is the predominant farming system. Agricultural activities are normally on small plots of land with a reliance on rainwater, and based on unpaid family labour and basic tools which accounts for low productivity.

Farming is labour intensive and women and men play important roles and contributions to agricultural production. However, women on average have a longer working day than men and spend almost double the amount of time as men on agricultural activities and reproductive roles around the house. They spend on average between 51 to 60 hours/week performing agricultural and household roles (ADB, 2005). This long working day often impedes women in attending training and other agriculture extension activities.

Women's mobility outside the home is generally limited. Women, in many cases are constrained by their husbands from working outside the home. Any activities outside the house have to be carefully negotiated with the husband. In many cases, this is due to mistrust from their husbands (ADB, 2005, Devtech Systems, 2004). This socio-cultural barrier to some extent affects women's opportunity and access to participate in agricultural and other community activities outside the home. For example, women are more reluctant to take part and play an active role in mixed seed production groups for this very reason, as expressed by female members of the women-only seed production groups during the field visit.

Rural women and men generally have a lower education and literacy rate compared to those in urban areas. In 2007, 52% of the rural adult population was literate, while in urban areas the rate was 74% (TLSLS 2007). Women's literacy rate is lower than that of men (UNDP, 2008)

Men more frequently travel to outside districts and Dili. Their frequent travel and interactions with people outside their villages, especially in Dili allow them to have greater access to information. It also affords them an opportunity to learn a second language other than their own local languages and the national language of Tetum. Men are more likely to speak and read Tetum, Portuguese and Bahasa Indonesia. Rural women generally speak only one of the sixteen local languages (ADB, 2005).

Having a higher literacy rate with the ability to speak more than one language has given men greater access to information and leadership positions in agricultural activities. In contrast, women's access to information comes mainly from their husbands and friends in their immediate community (ADB, 2005). Women's limited mobility and language skills should be given special attention in order to ensure an equal opportunity and access for women and men to participate in and receive agricultural extension services, training and information.

Women and girl children in general are vulnerable to food insecurity, resulting in a high level of malnutrition among them. Malnutrition, among children under 5 years old is a serious problem. Two-thirds of children are underweight and 14% severely underweight (The World Bank, 2008).

Around 28% of women suffer from malnutrition and 7% of them are severely malnourished and in need of treatment (ADB, 2005).Malnutrition to some extent contributes to maternal mortality rates.

Maternal mortality in Timor-Leste is still very high. The ratio is estimated at 660 deaths per 100,000 live births--the highest in Southeast Asia (the World Bank, 2008). Infant and child mortality rate is also high. The infant mortality rate is estimated at 98 deaths per 1,000 births—the worst in Southeast Asia. Th child mortality rate is estimated at 29 deaths per 1,000 children under 5 years old. This is three times higher than the average child mortality rate in Southeast Asia. High maternal, infant and child mortality rate are associated with a high fertility rate.

On average, each Timorese women, including those in rural areas, bears more than seven children during her reproductive lifetime. The National Fertility rate is estimated at 7.8 children per woman. It is not only high but has increased in the last 10 years and is nearly the highest in the world (The World Bank, 2008).

Women are responsible for household food preparation and are key actors in seed production. Promoting a high-quality seed program and improved foodcrops will not only promote food security for women, men and family, but will also assist the country in addressing the issues of malnutrition among women and children, improve their health status, thus promoting women's empowerment and gender equality.

Land rights is another major gender issue. Women generally do not have rights to land, unless they are from matrilineal communities where they have rights to own, inherit, use and manage land and other properties of the family. This matrilineal system is especially practiced in the *Bunak*-speaking ethnic communities in Bobonaro, Manufahi, and Covalima districts (ADB, 2005).

A lack of access to and control over land and other family property will potentially marginalize women from being involved as key actors in agricultural and seed systems. Introducing community seed production groups is an alternative to address this issue

2.2. Common Patterns of Gender Division of Labour in Agriculture

Women's and men's roles in agriculture in Timor-Leste varies according to their assigned gender roles within a given society and socio-cultural context. In general, gender division of agricultural labour can be divided into three different categories: productive roles, reproductive roles, and community roles. Women and men are normally involved in all three of these roles. However, their responsibilities and activities vary according to their socio-economic status.

In most societies, men are traditionally considered as the heads of household and community leaders, and are therefore the principal decision-makers in the household and in public/community affairs, although some consultation with women may take place in some cases. Social, economic, political and cultural activities outside the home including attending public meetings as well as participating in and receiving agriculture extension services are normally also assigned to men.

In terms of **productive roles**, both rural women and men are involved in agricultural production in subsistence and non-subsistence farming systems. Their tasks and activities vary according to the types of foodcrops and their assigned gender roles and responsibilities that have been passed on from one generation to the next. In general, women are more involved in subsistence agriculture, taking care of small livestock and non-farm income activities such as petty trading, making and selling handicraft (e.g. Tais a Timorese traditional cloth) and selling vegetables. Approximately

20% of subsistence farms are managed solely by women and only 4% of rice farming is managed by women (MAF-SoL, 2009).

In agricultural production some activities are performed by women and men together, and sometimes they involve their children. Other activities are done solely either by women or men which reflects a rigid gender division of labour. Common gender-division of labour in agriculture activities in four different crops can be seen below:

Farming Activities	Foodcrops							
	Maize		Sweet Potatoes		Cassava		Peanuts	
	F	M	F	M	F	M	F	M
Land preparation		X		X		X		X
Planting	X		X		X		X	
Weeding	X	X	X	X	X	X	X	
Harvesting	X		X	X	X	X	X	
Processing	X		X		X		X	
Marketing	X	X	X	X	X	X	X	

Women are normally involved in all activities, except land preparation. All activities that require physical strength and/or involve mechanization (such as tractor work, and carrying seed from the field to storage place) are normally conducted by men. Activities that are predominantly performed by women include seed selection, planting, harvesting and post-harvest processing (food storage, processing and preparation). Boys and girls are often involved, especially in harvesting (MAF-SoL, 2009).

Reproductive roles related to child rearing and care and maintenance of the household, such as cooking, washing and cleaning, fetching water and firewood are primarily assigned to women, while men normally spend very little time on these activities and are more involved in house building.

Community roles are predominantly played by men, with limited involvement of women. Gender roles for women and men at the community level are quite different. Men are normally assigned as community leaders (i.e., a district administrators, a head of village (suco). They play key roles in formal activities and in decision making, administration and management of socio-cultural, economic and political life of people at the community level. Women, on the other hand, are more involved in informal activities, such as in women's farmer groups (e.g. women's seed production groups). Women and men also participate in community meetings and agricultural extension activities, such as Farmer Field Days and training. However, women's participation in these activities is normally lower than men's. Women in many cases also participate in formal activities; such as attending district meetings, however they normally play a silent role and are passive participants.

2.3. Access to and Control Over Agricultural Resources and Inputs

Most rural societies in Timor-Leste live under a patrilineal system. However, there are also some rural areas where people live under a matrilineal system. These customary systems to some extent have a great influence over women's and men's access to and control over agricultural resources and inputs, especially land.

Under the patrilineal system, men have rights to own, inherit and manage land and other properties of the family. A woman who is married with a man from a patrilocal community has to move and live with her husband. Together with her husband, she manages and uses land, but does not have any property rights.

In contrast, women who live under a matrilineal system have relatively better rights compared to women who live under a patrilineal system. They have rights to inherit, own, manage and make decisions regarding land and other family's properties. The decisions regarding the use of land for agricultural activities are normally decided by women in consultation with their husbands. A man who is married with a woman from a matrilocal community moves with his wife to live and enjoy a piece of land given by his wifes' family.

In terms of access to planting materials and agriculture extension services, women generally have less access than men due to a number of reasons, such as socio-cultural barriers related to women's mobility, gender bias in distribution and delivery of planting materials (e.g. seeds, and agricultural equipment and tools), limited number of women extension workers, etc. For example, men have better access to formal seed distribution provided by MAF because men are considered as heads of households. In addition to this, the use of land as a criterion for seed distribution has resulted in marginalizing women, especially women headed households and those who live under patriarchal system in terms of benefits from seed distribution and production. The distribution of agricultural inputs, such as tractors and small hand tools is also more oriented to men, or given to the leader of seed production groups, instead of to all members. This in turn not only has created internal conflict between members and the leader of the groups, but also has marginalized poor women and men who are not in a better position as leaders of the groups.

2.4. Decision Making

Decision making in agricultural and seed production activities is normally dominated by men, both at the MAF-SoL management and at the community levels. This is partly due to a lower representation of women in decision making in MAF-SoL management. At the household and community levels, decision making, regarding crop varieties for planting for example is also mainly made by men. This is not only because the land is generally owned by men, but because men are traditionally and culturally considered as decision makers within the family and community. Another reason is due to limited participation and representation of women in leadership and decision making positions within district/suco administrations and in seed production groups. Mainly women-only seed production groups can enjoy and exercise their rights in decision making related to the distribution and management of a seed system as experienced by women-only seed production groups in Bobonaro District. The leader and members of the group discuss and make decisions in a participatory manner regarding issues such as planting location, work schedule, seed selection, seed storage, selling and sharing of seed production, etc.

2.5. Gender Impact of Seed Production Groups

The introduction of seed production groups (mixed and/or women-only groups) in some locations under other programs has increased women's work load because they still have to work on their own individual plots and in the households in addition to the group activities. However, women seed producers claimed that the seed production activities have brought a positive impact on the life of women and men farmers and their children. These positive impacts include: improved food security, as well as bringing social and economic benefits.

Even though the production from these groups is mainly for food consumption, women and men claimed that they also earned some income from selling the seeds. The income they earn is normally used to buy rice and new seeds, children's needs and education, cloth, etc.

Seed production activities, to some extent have also brought about a positive impact on women's empowerment. For example, through their involvement in women's seed production groups, women claimed that their sense of self-confidence and solidarity increased. Their skills related to seed production have also increased. More importantly, women seed producers also claimed that through their involvement in seed production groups, they have gained a greater opportunity to exercise leadership skills and demonstrate to society that they can also be leaders, just like men. Women seed productions groups strongly expressed their interest to actively participate in the groups.

2.6. National Policies on Gender Equality and Women's Empowerment

Timor-Leste has a strong commitment and has made significant progress in promoting gender equality and women's empowerment in the country. This strong commitment is reflected in the National Constitution of Timor Leste, article 16 and 17. Article 16 states that "*All citizens are equal before the law, shall exercise the same rights and shall be subject to the same duties"*. Article 17 stipulates that *"Women and men shall have the same rights and duties in all areas of family life and political, economic, social and cultural"*.

Timor-Leste ratified the UN Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) and the Optional Protocol to the Convention on the Elimination of all forms of Discrimination against Women on 16 April 2003. Timor-Leste also has a special Parliamentary Committee on *Poverty Reduction, Rural and Regional Development and Gender Equality* (Committee E) and formed Women Parliamentarians' Caucus as part of their strong commitment to promote gender equality and women's empowerment and the MDGs. The parliament approved a Resolution on Gender-Responsive Budgeting in 2009 as a way to ensure the government's accountability for gender equality and women's empowerment in the country. Through this parliamentary Resolution all government bodies are mandated to integrate gender issues and women's empowerment in all government policies and programs and allocate adequate budget to support the activities for gender equality and women's empowerment.

A State Secretary for the Promotion of Gender Equality (SEPI) (formerly named OPE) has been established. It is headed by a female Secretary who reports directly to the Prime Minister. The Government has also created Gender Focal Points in each ministry/state secretary including MAF to support the implementation and monitoring of gender equality programs at the national and sub-national levels.

To support gender equality and women's empowerment in the country, MAF has drafted a Gender Policy and Strategy in Agriculture and created a Gender Working Group that consist of a Gender Focal Point from each department within MAF. This GWG however, has been inactive and needs to be revitalized. In addition to this, MAF together with its development partners, including with SoL, has integrated gender concerns and women's empowerment issues in their agricultural and rural development program. MAF has also allocated a small budget to support activities related to gender equality and women's empowerment in agriculture.

3. GENDER ISSUES AND CONSTRAINTS

3.1. General Issues

There are a number of gender issues and constraints that need to be addressed in order for SoL III to be successful in promoting gender equality and women's empowerment in the program.

Socio-cultural, economic and political life of people in Timor-Leste in many cases is influenced by a patriarchal system. Under this system, women are considered to have a lower status than men. Gender roles, participation in, access to, and control over agriculture activities and benefits are also shaped by this traditional system and continue to be biased toward gender equality and women's advancement. Agriculture development programs are also often designed and implemented based on these traditional values. As a result, women farmers often have fewer opportunities to participate in agriculture development programs. They also have less access to and control over agricultural inputs and benefits.

It is well recorded that agriculture extension services and inputs do not reach and benefit women and men equally. The services and inputs are often more oriented toward men than women. The decision making related to agriculture development is also often made without consultation and participation of women. This is partly due to the lack of women leadership and representation at the community levels and in government and implementing agencies at the national, district and village (suco) levels. At the community level, men are traditionally considered to be the leaders and decision makers and are consulted with in regards to agriculture development interventions. In MAF, most staff at the national, district and village (suco) levels, including extension workers are men. As a result, agriculture development programs, services and inputs tend to be favourable to men and do not meet the needs of women and men equally.

Food insecurity and lack of nutrition are other important issues faced by women in rural areas in Timor-Leste. In situations where food is lacking, it is women and children who are most affected and are more likely to suffer from hunger and malnutrition.

Women headed households are especially more vulnerable and disadvantaged. They account for around 10% of the total rural population. They are poorer compared to men headed households (World Bank, 2008). Moreover, they generally do not have and/or have less access to land as land belongs to the men and/or the husband's family. Most agriculture development interventions are land-based activities, and as a consequence women are less likely to receive and gain benefits from agriculture development inputs and are more likely to suffer from food insecurity than men headed households.

Rural women also tend to work longer hours than men due to their multiple roles in agriculture, in the households and in taking care of children, elderly, and livestock, etc. As a result, women are often less able to participate in agriculture extension services, including training and field days. This is especially true if the extension service activities are conducted outside of the village.

Gender inequality undermines human, social and economic development not only in the agriculture sector, but also in all aspects of life. To improve food security and promote gender equality, these existing gender issues and constraints need to be carefully addressed in SoL III.

3.2. Gender Issues, Constraints and Actions related to Component of SoL III

Based on the four (4) program components of SoL III, a number of gender issues and actions that need to be taken have been identified in order for SoL III to bring maximum impact on the promotion of gender equality in seed system and food security in Timor-Leste.

3.2.1.C1: Evaluation and Release of Improved Foodcrop Varieties

- Women's concerns and needs should be considered in the research and selection of new food crop varieties. For example, improving the nutritional status of women and children, and reducing the amount of time women expend in farming activities are some important factors that need to be taken into consideration in the evaluation and release of new seed varieties.
- Capacity of women and men research staff in evaluation and release of new varieties from a gender perspective needs to be promoted and the number of female research staff needs to be increased.
- Evaluation and release of new improved foodcrop varieties needs to take into consideration these important issues, such as: impact of new seed varieties on gender division of labour, and on women's and men's access to and control over improved varieties. Other factors include, how new improved varieties have impact on time and labour use, on nutritional status and on income from a gender perspective.

3.2.2.C2: Formal Seed Production and Distribution

- In general, women tend to have less opportunity and access to seed production and distribution activities. This is partly due to several factors. These include:
    - The use of land as the main criteria in seed production and distribution potentially marginalizes the poor; including poor men and women farmers. This is, especially evident in women-headed households where they do not own land and therefore do not have equal access to participate in seed production and distribution.
    - Socio-cultural barriers related to the practice of patriarchal system in many parts of Timor-Leste. Under this system, land and other agricultural inputs are traditionally given to men and/or should be under the name of husband. Only women who live under the practice of matrilineal system, for example in the suco of Bunak, Bobonaro have access to land rights, entitlement and utilization. Thus, they have a better opportunity to participate and gain access to seed production and distribution then others.
- Seed production and distribution should also be targeted at poor men who have less access to land and to women farmers especially women headed households who do not own land.
- Women in general have less access to information related to seed production and distribution as seed distribution is normally aimed at men because of the traditional head of household belief.
- Lack of women extension workers to better engage with women farmers to understand the importance of women's roles, participation and needs related to seed production and distribution
- Limited awareness, understanding, and skills among MAF as related to the integration of gender equality into agriculture and seed production and distribution in particular. Awareness raising campaign and capacity building on gender and seed system related issues should be given to MAF staff at all levels.

- Women, in many cases are not involved in the decision making process regarding the selection of location for seed production and distribution at the suco level. Decision making process normally is conducted through consultations with MAF staff, district and sub-district administrators, who are dominated by men. Women seed production groups should be encouraged and involved in this process.

3.2.3.C3: Informal Seed Production and Distribution

- Support for an informal seed production and distribution channel such as the creation of Community Seed Production Groups (i.e., women's seed production groups) will increase women's equal participation and access to seed production, distribution, and income. However, at the same time this can potentially increase women's work load as the women have to perform their multiple roles in their family farm and domestic chores in addition to their group's farm. Therefore, a careful gender need assessment and analysis prior to the formulation of women seed production groups need to be taken.
- The creation of women-only groups should be established and strengthened. This is particularly important because women farmers prefer to work in women-only groups than in mixed-groups for several reasons, such as increasing their sense of empowerment as they have a better opportunity to make decisions regarding the production and distribution of seed as well as the management of labor and sharing of the benefits from their seed production. Other reasons include: men farmers are considered "lazy" and to avoid jealousy from the wife of a male member.
- Seed production and distribution should also be focused on improving nutritional status of farmers, especially women and children. Thus, the promotion of peanut in addition to maize and/or cassava and sweet potatoes is necessary. The promotion of peanut will not only help in improving nutritional status of women, men and children, but will also help in reducing women's work burden in seed farming activities and bring more cash to the women and family.
- The location of seed storage should be equally accessible for both women and men. The placement of seed storage in men's farming areas for example will limit women's access to the store and use of seed production.
- Technical extension support including training and agricultural inputs should be given to all members-women and men equally. Agricultural inputs, such as hand tools and equipment for farmer groups should not only be given or handed over to the group leaders, but should also be given to each member of the group. Providing agricultural inputs only to group leaders will potentially create an internal conflict regarding access and control over the use of agricultural inputs between members and a group leader as indicated during the field visit in Bobonaro.

3.2.4.C4: Seed System Management

- **Gender Policy and Strategy**: Draft gender policy in MAF has not been approved and Seed system gender policy and strategy has not been developed.

- **Gender Planning, programming and Budgeting:**
  - Gender issues are not fully integrated in the MAF planning process
  - MAF budget to support gender equality and women's empowerment in agriculture is very limited. The gender budget is mainly to support the celebration of National and International Women's day, International Food Day. ($ 15,000) and only a small amount of money is allocated to build the capacity of farmers, i.e. training on gender awareness and analysis for Gender Focal Point (GFP) and women farmer

groups at the district and suco levels; (approximately around $ 2,500/year). Funding for gender activities heavily relies on donor support (i.e.; GTZ, Spanish, JICA).

- **Staff:**
  - Women are still under-represented within MAF (240 women out of 1823 staff, and only 18 women are permanent staff).
  - Women are also under-represented in decision making positions in MAF.

- **Management and Coordination:**
  - Gender Focal Point (GFP) has been created and appointed in 13 districts, however there is no budget allocated to support the operational cost of GFP.
  - Gender Unit within MAF was established in 2009 (supported by 2 female staff). In addition to this, MAF has also created a Gender Working Group (GWG), comprised of 21 staff members (16 women and 5 men), representing all Directorates within MAF. The GWG quarterly meeting however has been inactive due to a lack of support from senior management, especially since the absence of the international gender adviser within MAF who previously led the GWG regular meeting.
  - Lack of involvement of and coordination between Gender Unit, M&E and SoL II

- **Monitoring and Evaluation:**
  - Lack of gender/sex disaggregated data and gender-sensitive monitoring and evaluation (i.e.; MAF does not have gender checklist in its M&E system).

- **Capacity Building**
  - A number of gender training classes have been conducted and participated by MAF staff. However, the training has mainly focused on gender awareness raising and sensitization. Knowledge and capacity of MAF staff in gender mainstreaming in agriculture, especially in seed management system has still been very limited.
  - There has been a strong interest and need expressed by MAF staff in the Directorate Office (i.e., National Directorate for Policy and Planning) and SoL II for gender training related to seed production, distribution and management system as well as food processing, nutrition and leadership. Capacity building on gender equality and seed management system should be targeted at all staff involved in SoL III including senior management at MAF and SoL at the national, district, and suco level.

4. EVALUATION OF GENDER ISSUES AND APPROACHES UNDER SoL II

SoL II has been committed to promoting equal opportunity to women and men as participants and beneficiaries of the program. To achieve this, SoL II applied a strategy to integrate gender perspectives into all aspects of program implementations and ensured that all activities would be equally available to women and men farmers. SoL II also promoted women's participation and leadership at all levels, while at the same time being sensitive to the underlying social and cultural issues that limit women's involvement in agricultural activities.

4.1. Achievements

Assessments have shown that SoL II made considerable progress in terms of promoting women's and men's equal opportunities as participants and beneficiaries of seeds and agriculture productions.

4.1.1. Participation and Access to Seed Production

SoL II supported 28 seed production groups, focused on three different crops. These crops included: peanuts (Utamua-8 groups), rice (Nakroma-9 groups), and maize (Sele-11 groups). The total number of seed producing groups increased from a total of 25 in 2008 to 28 groups in 2009. Accordingly, the number of women-only seed producer groups has also increased from 19% in 2008 to 25% in 2009. Women especially engaged in peanut seed production (5 groups) and Sele maize (2 groups). However, none of them were involved in Nakroma. Women are especially involved in peanut seed production because it has more economic value, and requires less time and labour to produce compared to the other two crops.

To address the issue of labour intensity for post-harvest activities, SoL II has been successful in reducing women's workloads through the introduction of high-yielding crops. For example, Nakroma and Sele requires less time in pounding and cooking times as compared to local varieties (i.e., Suwun 5).

4.1.2. Participation and Access to Extension Services, Information and Technology

SoL II has also been successful in promoting women's participation and access to agricultural extension services. For example, as of June 2009, women farmers made up more than 30% of the total number of 938 participating farmers in Farmer Field Days (FFDs). Considering the heavy workload of women in agriculture production and household management, the 30% participation rate of women in FFDs is considerably high. To increase the access of women and men farmers to agriculture services and information, SoL II field staff used national language (Tetum) and local language during FFDs, so that women and men farmers could better understand the agriculture information delivered during the FFDs.

4.1.3. Human Resources Policies

In terms of promoting gender balance in its own management, on average SoL II has around 40% female staff. This included women research staff, trainers and advisers. This percentage of female staff is significantly high, especially if it is compared to the participation of women in MAF which is only around 5%. SoL II also applied a policy to locate female professional staff in pairs in sub districts, so that they can travel and work together in rural and remote areas.

4.1.4. Capacity Building for Staff and Farmers

SoL II has also made significant progress in building the capacity of SoL/MAF staff. Capacity building was provided through direct and indirect support for staff to attend Postgraduate degree, on the job training and short-term courses. A number of women and men research and crop production staff were sent to attend various training related to agriculture and seed production nationally and internationally. The staff were trained in the following areas: statistics, bi-monthly English training, motorcycle skills, computer skills (Excel), Farmer Participatory Research, etc. Women OFDT staff were also provided with and were trained on how to use a scooter and

motorbike, so that they could easily reach women and men farmers to deliver their services and no longer have to face with the problem of lack of transportation.

Capacity development for farmers was conducted through a number of ways. These included through establishment of OFDTs, on-the job training, and Farmer Field Days (FFDs). During the FFDs, SoL staff and farmers discussed and shared information on seed production and technology related issues.

4.1.5.Gender Research and Disaggregated data

SoL II conducted a number of agriculture research projects from a gender perspective in order to address the issue of limited gender data and information in this area. One significant achievement was the production of a gender-specific agricultural calendar that clarifies gender roles and responsibilities. The calendars were distributed to MAF and NGOs and other interested parties to assist with extension activities.

4.2. Limitations and Lessons Learned

Even though there has been significant progress in the promotion of gender equality and women's empowerment, there are still a number of limitations and critical issues that need to be addressed for continuous improvements and future actions, as described below

Gender Approach and Strategy. Despite commendable efforts to promote women's empowerment and gender equality in SoL II, there has been no clear strategy for integrating gender issues into all components and/or activities of SoL II. Approach and efforts seem to be limited and isolated to women's participation and gender balance only, rather than addressing gender-related impediments and gender inequality in a broad and strategic way. It seems that there is a tendency to misinterpret "gender" with "women" and correspondingly efforts to promote gender equality and women's empowerment seems to be limited to adding activities for women only and counting the number of women who participate in the activities as a measurement for gender equality. Empowering women cannot be achieved through women-focused activities only. This type of activity can actually endanger the promotion of gender equality and empowerment, especially if it is done without effort to systematically address the root cause of gender inequalities.

Institutional Mechanisms. Efforts to promote gender equality are hampered by a lack of institutional mechanisms to support the integration of gender equality and women's empowerment issues within SoL II. When the assessment was conducted, SoL II did not have a Gender Team and/or staff with gender expertise (i.e., gender adviser/specialist, program officer, researcher and gender focal point) to assist with policy dialogue, implementation monitoring, awareness raising, capacity development, advocacy, networking and partnership for gender equality. A full time Gender Team, consisting of a gender expert, gender focal point, and program officer, for example are crucial to ensure that policy and strategy is implemented and the work of SoL II on promoting gender equality and seed production is visible.

Awareness-raising and Capacity Development for Gender Equality. SoL II did not fully seize on the opportunity to build further awareness and capacity of the MAF/SoL staff and it beneficiaries on gender equality issues related to seed production. To its credit, MAF/SoL showed a great interest in building their capacity on gender mainstreaming related issues in agriculture. However, attempts to build the capacity among staff have been very limited and there has been no gender training for the staff to date. Gender sensitization and/or awareness raising campaigns on issues related to seed production for different audiences, such as MAF senior staff, farmers, and

women's groups/organizations is limited. A comprehensive awareness-raising campaign and capacity development plan for its staff, beneficiaries and partners therefore needs to be developed.

Monitoring and Reporting. There is significant effort to use gender/sex disaggregated data in its M&E and reporting system. However, this effort to some extent is still a work in progress. . For example, not all activities are monitored, analyzed and reported using gender-disaggregated data. SoL II should make more effort to systematically integrate gender/sex disaggregated data into its M&E and reporting system in order to measure progress and results from a gender perspective. Gender sensitive M&E and reporting system should be developed from the onset.

Advocacy and Partnerships. Efforts to build awareness and partnerships in promoting gender equality seem to be very limited compared to what SoL II could achieve. Materials for gender advocacy seem to be focused on the dissemination of research reports and findings to a limited audience. Partnerships such as the Gender Unit within MAF, women's groups/organizations and mass media have yet to be established. Although the MAF Gender Working Group (GWG) has been fairly in-active, this group has great promise and has the potential to be strategic in furthering the goals. SoL together with the Gender Unit can utilize the GWG, as a gender strategic mechanism to promote and advocate gender equality within the seed system for policy advocacy, while at the same time helping MAF to reactivate the GWG.

In conclusion, all these important issues need to be addressed for SoL III to be effective in implementing a seed system gender strategy and promoting gender equality and women's empowerment. Both at the individual and institutional levels, the capacity and framework for a systematic and effective implementation of gender strategy should be fulfilled. For this to happen, adequate human resources and financial support are needed.

5. PROPOSED GENDER STRATEGY FOR SoL III

Mainstreaming gender equality in land-based interventions and activities, such as seed production and distribution in a patriarchal society, like Timor-Leste where land rights and ownership are predominantly given to men, is not an easy task. It requires systematic efforts, an integrated comprehensive approach and strategy, collective support and responsibility, and high commitment from all participating parties from all levels of society, government, senior managers to all staff and people-women and men farmers-at the grass-roots level.

It also requires an enabling environment such as effective policies, human and financial resources and adequate capacity of all participating stakeholders to ensure that gender equality and women's empowerment in the seed system can be effectively promoted. Effective gender strategy and programming should be comprehensive, targeted at the policy, organizational and community levels, through such as policy formulation, organizational change, capacity building, adequate sex/gender disaggregated data, public awareness campaign and advocacy, as well as multi level partnership and networking.

The proposed seed system gender strategy is designed to be as comprehensive as possible. It includes a combination of interventions at policy, organizational and community levels. It is aimed at bringing positive changes in policies, organizational and management practices, as well as socio-cultural norms, perceptions, and behaviour that contributes to the promotion of gender equality in participation, access and control over socio-economic resources and gender power relations in decision making process in all aspects of seed system.

5.1. Seed System Gender Strategy

Seed System Gender Strategy is formulated within the context of overall goal and strategy of SoL III program.

The main objective of the Seed System Gender Strategy is:

" to promote a full and equal participation, access and benefit of women and men from all activities, processes and outcomes of the SoL III program, by integrating gender equality issues into design, planning, implementation, monitoring and evaluation of the program, thereby contribute to food security in Timor-Leste"

Experience has shown that efforts to promote gender equality in development programs often fails due to the following factors:

- Lack of commitment and support from the highest-level leaders for specific objectives on gender equality.
- Commitment is not translated into action, indicated as such by a lack of adequate human and financial resources to support gender related interventions.
- Lack of awareness and capacity for mainstreaming gender.
- Lack of institutional support structures and mechanism within implementing agencies (i.e. gender unit, gender focal point, gender specialist, etc)
- Lack of gender-sensitive monitoring system (i.e., sex/gender disaggregated data and indicators) to measure progress and impact.

To address these issues and bring maximum impact to the promotion of gender equality and women's empowerment in the seed system, SoL III will utilize the following crosscutting Seed System Gender Strategy:

1. **Awareness-raising campaign and advocacy.** Increasing awareness of all key actors involved in SoL III at all levels on the importance of gender equality is the first important step that needs to be taken in order to gain support for the promotion of gender equality in seed production, distribution and management system at the national and sub-national levels. Given the "invisible" roles of women in seed production and distribution, special attention will be given to increase the awareness of all participating stakeholders at the national and sub-national levels, including policy makers, MAF and SoL III staff, women and men farmers in rural areas on the importance of women's roles, participation and contributions to seed production and distribution and food security in the country. Awareness-raising campaigns and advocacy will be conducted using various communication and advocacy tools, including mass media (radio, television, and newspaper), publication and dissemination of research, and release of improved varieties from a gender perspective and other printed materials, such as brochures to all stakeholders at the government and community levels. Under this strategy, support will include:
    a. Production of an awareness-raising campaign including a advocacy plan and materials (i.e., posters, brochures, publication, etc) for different target groups on gender equality, women's empowerment, seed production and food security.
    b. A series of gender sensitization workshops and training for leadership and staff of MAF and SoL III, women and men farmers.
    c. Radio and television talk shows.
    d. Public dialogues and discussions at the government and community level.

2. **Strengthening commitment and leadership for gender equality.** Promoting gender equality and women's empowerment requires a strong and consistent commitment and leadership from all stakeholders involved in SoL III. It also requires adequate gender-sensitive mechanisms at the policy and operational levels. For this purpose, SoL III will support efforts to strengthen commitment and leadership for gender equality through the following interventions:
    a. Support for the creation and promotion of seed policy dialogue and formulation from a gender perspective
    b. Support for the development of a Gender Action Plan for the Seed Management System.
    c. Promote gender balance and increase women's participation in the decision making process in seed management system within MAF and SoL III
    d. Provide technical assistance through the appointment of gender adviser, gender program officer and gender research officer to ensure that gender perspectives are integrated into the whole process of SoL III programming and seed management system within MAF. .
    e. Promote and facilitate the integration of gender equality issues and sensitivity as criteria for the recruitment and selection of staff to be employed in SoL III.

3. **Promoting gender-sensitive research, data collection, analysis and dissemination of sex/gender disaggregated data and information into all aspects of seed programming (design, planning, implementation, monitoring and evaluation) at all stages.** To ensure that women and men will equally benefit from the program, thus research design and implementation as well as evaluation and release of new improved foodcrop varieties need to take into consideration these important issues, such as: impact of new seed varieties on gender division of labour, and on women's and men's access to and control over improved varieties. Other factors include, how new improved varieties have impact on time and labour use, on nutritional status and on income from a gender perspective. Sex/gender disaggregated data on all aspects of seed research and programming should be promoted, analyzed, disseminated and used for measuring progress and as a performance management tool. Under this strategy, SoL III in particular will support the following activities:
    a. Training on agriculture and seed research, data collection, analysis and reporting from a gender perspective.
    b. Integration of gender perspective and analysis in on-farm research, evaluation and release of improved seed varieties
    c. Conduct gender impact assessment of new released improved seed varieties.
    d. Integration of gender equality issues into all aspects of MAF seed management system (design, planning, implementation, monitoring and evaluation and reporting).

4. **Strengthening institutional and technical capacity for gender mainstreaming in SoL III.** Institutional and technical capacity for the integration of gender equality into all aspects of seed production and management system (policy, human resources, financial, management and operational aspects) within SoL III must be strengthened at the national and sub-national levels,. This support will be provided via technical assistance, and production of capacity development plans and materials, gender training, and funding to attend course/seminar/workshop/conferences, and production of various gender training materials (i.e., gender training module, gender check list, and handbook).

5. **Promoting women's access, participation and leadership in decision making.** To reduce the gender gap and ensure that women's voices and needs are heard, SoL III will

focus special attention on promoting women's access, participation and leadership in the decision making process in the seed management system. This will occur at the government and community levels and will be done through a number of initiatives, which include among others:

a. Targeted awareness-raising campaign on the importance of equal access, representation and participation of women and men in decision making in the seed management system.
b. Integration of gender equality issues and the promotion of gender balance policy into all aspects of human resource management of the seed management system, including in job descriptions, recruitment, and staff training and promotion. Gender balance and women's leadership will also be promoted in the formulation and selection of the seed production groups and leaderships.
c. Support for capacity development in the areas of leadership and seed management system. This might include leadership/advocacy training including such items as planning, communication, negotiation, management and gender budgeting, for MAF/ SoL III staff as well as women and men farmers.

6. **Promoting women's access to agricultural inputs, extension services, information and technology.** Access to and the use of improved agriculture inputs, such as improved seeds, seed storage, fertilizers and pesticides, as well as agricultural hand tools and equipment is generally limited among seed producers, especially among women seed producers. Women farmers in general also have less access to extension services, training, information, and technology as compared to men farmers. This is particularly due to several reasons, which include: gender bias in seed distribution, lack of women technical and extension staff, time constraints, and socio-cultural barriers that prohibit women's access and mobility on an equal basis as men. For example, seed production and distribution are land-based activities where women in general, have limited access to land ownership unless they live under matrilineal system. Correspondingly, the formal seed and extension services for seed production and multiplication are normally given to men farmers based on a traditional socio-cultural belief and practice that men are the land owners and head of households. This socio-cultural barrier impedes women, especially those who do not have access to land from being involved in seed production and from having access to agricultural extension services. To address this issue and promote gender equality in these areas, SoL III will support a number of initiatives, which include among others:
    a. Support for the integration of gender equality issues into the management of seed distribution, including the management and delivery of agricultural extension services at the government and community levels.
    b. Support for the creation of women's seed producer and marketing groups.
    c. Support for the development of extension materials including a module on seed management system from a gender perspective.
    d. Gender training for extension workers, including women and men farmers and seed producers.
    e. Increase the number of women technical and field staff.
    f. Promote equal distribution of agricultural inputs to all members of seed production groups.

7. **Building and strengthening strategic networks and partnerships.** To gain a greater national support for the promotion of gender equality in seed production and distribution, SoL III will build and strengthen its strategic networks and partnerships with multi stakeholders (i.e. government, donors, I/NGOs, farmer groups/associations, rural women's groups, etc) at the national and sub-national levels. This will be done through support and

facilitation of the establishment of forums, networks, working groups, dialogues, consultative meetings, workshops, and conferences related to gender equality in seed management and food security. For this purpose, SoL III will support the creation of a forum on Gender and Seed at the national and sub-national levels and at its regular meetings through technical and financial assistance. The forum will consist of representatives' from MAF, SoL III, and seed production and marketing groups (women and men farmers) including existing women's farmer groups/associations, and other interested parties.

8. **Involving and working with men to promote gender equality and women's empowerment in seed production, distribution and management system.** Gender equality entails changing perceptions, attitudes, and unequal gender relationships that perpetuate gender inequality between women and men. In rural areas of Timor-Leste, where social and cultural barriers and the patriarchal system in many cases is still strong, working with and involving men in program activities will facilitate a smooth achievement of the program outputs. Thus, SoL III will actively encourage and involve men to work together with women in all interventions. All activities of SoL III will be targeted at both women and men on an equal basis. This strategy especially will be implemented for example, through support for the establishment of mixed women and men seed production and marketing groups. This will be in addition to women-only seed production and marketing groups at the community level. SoL III will also support the creation of a forum/working group on gender equality and seed system that consist of women and men members.

5.2. Gender Outcomes, Outputs and Activities

The overall goal of SoL III is to improve food security through increased productivity of major foodcrops. To achieve this goal, SoL III has four (4) main components and outcomes, which include:

Component 1 : Evaluation of improved varieties
Outcome 1 : Improved varieties of foodcrops identified and released

Component 2 : Formal seed production and distribution
Outcome 2 : Sufficient high quality seed being produced through formal channels to maintain the genetic quality of released varieties.

Component 3 : Informal seed production and distribution
Outcome 3 : Mechanisms for the production and distribution of seed through informal and market channels strengthened.

Component 4 : Seed System Management
Outcome 4 : MAF capacity to manage the national seed system strengthened

To ensure that the four (4) main components and outcomes of SoL III promotes gender equality, a preliminary set of gender-sensitive corresponding outcomes, outputs and activities have been identified, to be finalised during Inception. A set of gender-sensitive indicators to measure impact of the program has also been developed as described below.

PROGRAM COMPONENT 1: Evaluation of improved varieties
COMPONENT OUTCOME 1 Improved varieties of foodcrops identified and released
GENDER OUTCOME: ▪ Gender concerns recognized and integrated in the evaluation and release of improved varieties
OUTPUTS: ▪ Gender awareness and capacity of MAF staff to conduct research, data collection, analysis and reporting as well as to manage the introduction and evaluation of new varieties from a gender perspective enhanced. ▪ Improved varieties of foodcrops evaluated and released incorporating a gender perspective. ▪ Gender and social impact assessment and analysis of improved varieties conducted, published and disseminated widely.
ACTIVITIES: ▪ Develop gender awareness raising, advocacy and capacity development plan and materials (gender training module, gender check list, handbooks, posters, brochures, etc) related to evaluation and release of improved varieties. ▪ Organize a series of awareness-raising and capacity development training on gender-sensitive research, data collection, analysis, and reporting for MAF and SoL III staff. ▪ Reinforce the current gender perspective and analysis in on-farm research, evaluation and release of improved seed varieties ▪ Conduct and publish gender and social impact assessment and analysis of improved varieties.

PROGRAM COMPONENT 2: Formal seed production and distribution
COMPONENT OUTCOME 2: Sufficient high quality seed being produced through formal channels to maintain the genetic quality of released varieties.
GENDER OUTCOME: ▪ Gender concerns integrated into the distribution of high quality formal seed
OUTPUTS: ▪ Gender awareness and capacity of MAF staff to manage the distribution of formal seed from a gender perspective developed and strengthened. ▪ Formal seed distributed to women and men farmers ▪ Technical extension support provided to women and men farmers.
ACTIVITIES: ▪ Develop gender awareness raising, advocacy and capacity development plan and materials (e.g. gender training module, gender check list, and handbooks, posters, brochures, etc) related to the production and distribution of formal seed ▪ Organize a series of awareness-raising and capacity development training for MAF and SoL III staff as well as women and men seed producers/farmers. ▪ Develop gender-sensitive guidelines for formal seed distribution (i.e., set up criteria for seed distribution, and target beneficiaries from a gender perspective) ▪ Provide technical extension support to women and men seed producers/farmers.

PROGRAM COMPONENT 3: Informal seed production and distribution
COMPONENT OUTCOME 3: Mechanisms for the production and distribution of seed through informal and market channels strengthened
GENDER OUTCOME: ▪ Gender-sensitive informal/market based seed production and distribution mechanisms strengthened.
OUTPUTS: ▪ Women's Community Seed Production Groups (CSPGs) and Farmer Seed Marketing Groups (FSMGs) established and strengthened. ▪ Mixed women and men CSPGs and FSMGs established and strengthened. ▪ Women and men's equal access to agricultural inputs, extension services, and information promoted and strengthened. ▪ Gender awareness and capacity of women and men seed producers and other key actors involved in informal seed production and distribution on gender equality issues enhanced. ▪ Technical extension support for women and men farmers provided.
ACTIVITIES: ▪ Develop gender awareness raising, advocacy and capacity development plan and materials (gender training module, gender check list, and handbooks, posters, brochures, etc) related to production and distribution of seed through informal channels ▪ Organize various awareness raising and capacity development activities on gender equality, seed production and leadership related issues to women and men seed producers/groups and other key actors involved in informal seed production and distribution. ▪ Support and facilitate the establishment of women's CSPGs and FSMGs. ▪ Support and facilitate the establishment of mixed women's and men's. CSPGs and FSMGs. ▪ Provide technical extension support to women's and men's CSPGs and FSMGs (as mixed and women-only groups)

PROGRAM COMPONENT 4:
Seed System Management

COMPONENT OUTCOME 4:
MAF capacity to manage the national seed system strengthened

GENDER OUTCOME:

- Gender equality issues integrated in national seed policies, programming and management system and capacity of MAF to manage the national seed system from a gender perspective strengthened.

OUTPUTS:

- Gender awareness and capacity of MAF/ SoL III staff and women's and men's CSPGs related to gender-sensitive seed management system increased.
- Gender-sensitive seed management system developed and implemented.
- Gender Action Plan developed and implemented.
- A gender team for the seed management system created and strengthened.
- Gender balance in all managerial and technical posts strengthened and women's participation in decision making process in seed management system increased.
- Gender sensitive monitoring indicators developed and implemented for tracking progress.
- A multi-stakeholder forum consisting of government, donors, I/NGOs, rural women's groups/association on Gender Equality and Seed at the national/sub-national levels established and strengthened.

ACTIVITIES:

- Develop gender awareness raising, advocacy and capacity development plan and materials (gender training module, gender check list, and handbooks, posters, brochures, etc) related to seed management system from a gender perspective.
- Conduct a series of gender awareness-raising and capacity development activities for MAF and SoL III staff, women's and men's production groups.
- Organize policy dialogues, meetings, workshops for the integration of a gender perspective in seed management system (policy, programming, human resources, and operational processes).
- Develop a seed system Gender Action Plan.
- Develop gender sensitive monitoring indicators.
- Develop, implement and monitor annual gender action plans and corresponding budgets related to the implementation of seed system gender strategy.
- Create a gender team (Gender Specialist, gender focal point of relevant directorates, gender program officer and SOSEK gender research officer to provide technical assistance, advocacy and monitoring of the implementation of MAF seed system gender strategy.
- Facilitate the creation of a multi-stakeholder forum on Gender and Seed at the national and sub-national levels to strengthen network, partnership and advocacy for the implementation of gender-sensitive seed management system.

5.3. Resources Required

5.3.1. Equipment and building

The availability of adequate seed storage and agriculture hand tools and equipments, such as maize sheller for women seed producers should be provided under Component 3. Given women's limited mobility and their heavy workload in agriculture, household seed storage should be in a safe place/location near by and/or at a women's house where it can be easily accessed by women farmers.

The placement of seed storage in specific safe locations and the distribution of maize shellers to women seed producers will not only reduce the time that women spend in seed production, but will also help improve the quality of harvest produced by women.

5.3.2. Training

Various gender training should be given to all key stakeholders involved in SoL III. The training is aimed at building and strengthening the capacity of various key stakeholders involved in SoL III in promoting gender equality in seed system. The participants of training will include women and men farmers, SoL III and MAF staff both at the leadership, managerial and technical positions. Training must be equally targeted at both women and men, thus gender balance should be taken into consideration in the selection of participants for the training. Training modules, methods and delivery will be designed according to the different needs and level of understanding of each target group on gender issues in agriculture and seed system. Therefore, a gender training needs assessment for different target groups must be conducted prior to training and a comprehensive training plan and materials should be developed according to the needs of each different target groups.

Possible gender training might include, but not be limited to the following:

- Gender sensitization
- Gender analysis and mainstreaming
- Gender research, data collection, analysis and reporting
- Social and gender impact analysis
- Gender disaggregated data, monitoring and evaluation for agriculture and seed system
- Gender leadership training, including communication and public speaking skills, negotiation, lobbying, teambuilding, group mobilization
- Gender-sensitive planning and budgeting
- Gender, seed system and food security
- Gender and agricultural extension
- Post-harvest food processing, etc.

5.3.3. Technical Assistance (TA)

Technical Assistance (TA) is one of critical support areas that is needed in order to effectively mainstream gender into SoL III. Provision is made for 10 person-months of ST TA from a Gender Specialist TA, including 4 pm in PY1, 3 pm in PY2, 2 pm in PY3 and 1 pm in PY4. The Gender Specialist will play important roles in providing technical support for capacity building, policy dialogue, development of a seed system gender action plan, overseeing and monitoring the implementation of seed system gender strategy, coordination and liaison with MAF, especially with MAF Gender Unit and other relevant Directorates and departments/units. The initial input in PY1

will focus on finalising the Gender Strategy and preparation of a concise Gender Action Plan to operationalise this STartegy. The Gender Specialist will also play a critical role in networking and partnership building, knowledge and information sharing and advocacy for gender equality in seed system. The Gender Specialist will be supported by a Gender Coordinator and a Gender Researcher within the M&E/ SOSEK Unit.

5.4. Implementation Roles and Responsibility

Gender mainstreaming is not the responsibility of only the Gender Specialist, but it is a collective responsibility. To promote gender equality in the seed system, efforts and responsibility should be made by all staff within MAF and SoL III, from senior management to field staff at the national and sub-national levels. SoL III Program Management and MAF, especially the NDR&SS, NDA&H, and NDACD who are directly involved in SoL III, with assistance from the SoL III gender team, should play a leading role and be responsible for the implementation of a seed system gender strategy. For this strategy to be successful and be sustainable over the long term, the involvement of and coordination with other relevant National Directorates within MAF, such as National Directorate for Policy and Planning (especially the Gender Unit within this National Directorate), and the District Administrator and Suco Extension Officers at the sub-national level is crucial, must be developed and strengthened.

5.5. Monitoring and Evaluation

Monitoring and evaluation of the program will be guided by the overall goal, outcome and outputs and their corresponding indicators. Progress, achievements and impact of the program on gender equality will be measured using a set of qualitative and quantitative gender-sensitive indicators.

Gender-sensitive indicators and a gender-sensitive monitoring and evaluation plan will be developed in close cooperation with the program's executing and implementing partners during Inception, with the full involvement of the Gender and M&E Specialists.

6. KEY RISKS AND MITIGATION

A number of risks which might impact the implementation and achievements of gender strategy have been identified:

Risk 1: **Lack of support for gender strategy**
There is a potential risk that support for implementation of a seed system gender strategy from MAF might be weak for some reasons:

- MAF Gender Policy and Strategy has been drafted under the supervision of the National Directorate for Policy and Planning, but has not been approved to date.
- Lack of a gender mechanism, human and financial resources and capacity among MAF staff to support the approval and implementation of gender strategy. MAF has established a Gender Unit within the National Directorate for Policy and Planning. The Gender Unit however, is only supported by two junior female staff with limited decision making powers, capacity and financial support to advocate and implement gender strategy within MAF. MAF does not have a full time gender expert to advocate for the approval of the MAF gender strategy and to develop the capacity and work on gender issues on a daily basis with MAF staff.

- The Gender Working Group within MAF which could play an important role in advocating gender issues has been inactive since the absence of a Gender Specialist.
- Decision making within MAF is dominated by men, with limited understanding, experience and capacity on mainstreaming gender in the work of the Ministry.

Mitigation:

- A gender support structure/mechanism of seed system (Gender Specialist, gender program officer, and/or gender focal point) should be developed immediately to advocate, oversee and monitor the implementation of a seed system gender strategy.
- Gender issues should be included as important points in the agenda of policy dialogue and programming between AusAid and MAF.
- An awareness raising campaign and capacity building on gender and seed system should be considered as important as other priorities and conducted continuously within MAF and at the community level throughout the program implementation.
- Gender Action Plan of the seed system should have clear, specific and measurable objectives, concrete activities and indicators. The plan, should be developed immediately (within a year at maximum) in close consultation with MAF in order to build a common vision and gain greater support and commitment to the implementation of seed system gender strategy.
- Gender monitoring and evaluation plans with gender-sensitive indicators should be designed and developed immediately in the inception phase of the program to measure progress and results.

Risk 2: Time Constraints

There is a potential risk that MAF staff, especially those in decision making positions, and seed producers, especially women seed producers might not be able to devote sufficient time to be fully involved in capacity development activities due to the pressure of other commitments and their busy schedule.

Mitigation:

- Capacity development plan and program should be developed from the onset in close consultation with MAF decision makers to gain a common vision and strong commitment among MAF decision makers to implement and participate in the capacity development activities (i.e., workshop, training, etc).
- Capacity development program plan and schedule should be designed based on a careful gender training needs assessment and relevant to the needs and the daily work of each target groups.
- Proper training methods and scheduling should be applied according to characteristics of each target groups and developed in close consultation with each targeted groups (i.e., MAF, SoL III staff, and seed producers).

APPENDIX 4

RELATED DONOR-FUNDED PROGRAMS AND PROJECTS

Project title: Rural Development Programme (PADRTL)		
Coverage: Aileu, Bobonaro, Covalima, Ermera, Manufahi and Liquiça.	Budget: US$1.2 million	Duration: 2008-10; 2011-13

Description: Focused on community-based nurseries, agroforestry, coffee and other permanent cash crops (cashew, coconut, clove, and high value forest trees) agricultural extension services.

Relevance to SoL III:

(i) Potential user of SoL III seed: Yes - agreement already in place for PADRTL to distribute SoL seed (mainly maize) to coffee and tree crop growers

(ii) Possible source of seed skills: Yes – good skills working with poor and risk adverse farmers in upland cropping systems.

(iii) Possible budget sharing (for SOEs): No – program has limited budget

(iv) Specific skills for SOE training: Yes – good technical and extension skills, and experienced working with assigned SEO in their target districts

(v) Other: Possible organizer of contract seed growers, but experience in 2009/10 indicated that approach (larger mechanized areas) any need to be reconsidered.

Project title: Covalima-Oecusse Participation and Empowerment for Livelihood Improvement and Food Security Enhancement Programme (EC-funded and implemented by Oxfam)		
Coverage: Covalima and Oecusse	Budget: US$2 million	Duration: 2007-11

Description: The project aims to support the empowerment of 3,000 households in Covalima and Oecusse Districts to increase food security; and to improve, diversify, sustain and replicate strategies for more secure livelihoods.

Relevance to SoL III:

(i) Potential user of SoL III seed: Yes – already using Sele maize variety and reporting excellent results; also potential to use other SoL varieties

(ii) Possible source of seed skills: No

(iii) Possible budget sharing (for SOEs): No

(iv) Specific skills for SOE training: Some – have experience of working with MAF staff and very poor isolated farmers

(v) Other: Good partner for SoL's operations in this isolated district

Project title: From Hunger To Health: Strengthening Community Capacity And Resilience For Food Security in Oecusse (EC-funded and World Neighbours implemented)		
Coverage:Oecusse	Budget: US$1.5 million	Duration: 2007-11

Description: Aim is to reduce rural poverty and increase food security for 18,000 people in upland, rural communities in Oecusse. Also aims to improve the ability of local government and civil society organisations to support community-based and pro-poor initiatives.

Relevance to SoL III:

(i) Potential user of SoL III seed: Yes – SoL needs to make contact and promote its improved varieties

(ii) Possible source of seed skills: No

(iii) Possible budget sharing (for SOEs): No

(iv) Specific skills for SOE training: Some – have experience of working with MAF staff and very poor isolated farmers

(v) Other: Good partner for SoL's operations in this isolated district

Project title: Options for Food Security Transformation - Lautem and Manufahi (EC-funded and implemented by Concern)		
Coverage: Lautem and Manufahi	Budget: US$1.9 million	Duration: 2007-11
Description: Aims to contribute to the achievement of Timor-Leste's poverty reduction target through increased opportunities for 3,000 rural households to achieve secure and sustainable livelihoods by 2010. **Relevance to SoL III:** (i) Potential user of SoL III seed: Yes – as SoL's varieties will increase crop yields (ii) Possible source of seed skills: No (iii) Possible budget sharing (for SOEs): No (iv) Specific skills for SOE training: Possible – could learn from Concern's lessons (v) Other: Possible partner for SoL's operations in these districts (note: RDP III is also working in Manufahi)		

Project title: Attaining Food Security Through Improved Agricultural Production System Among Dry Upland and Coastal Communities in Timor-Leste (EC-funded and implemented by CCF)		
Coverage: Manatuto and Lautem	Budget: US$1.1 million	Duration: 2007-11
Description: Aims at poverty reduction for 20,000 indigenous farmers living in the dry and vulnerable uplands and coastal areas in Manatuto and Lautem Districts. **Relevance to SoL III:** (i) Potential user of SoL III seed: Yes – SoL's varieties perform well in these conditions (ii) Possible source of seed skills: No (iii) Possible budget sharing (for SOEs): No (iv) Specific skills for SOE training: Possible as Project is working with these MAF staff (v) Other: Possible partner for SoL's operations in these districts		

Project title: Local Initiatives for Food Security Transformation Project (LIFT) (EC-funded and implemented by CARE)		
Coverage: Bobonaro and Liquiça	Budget: US$2.0 million	Duration: 2007-11 extended
Description: Aims to improve food security and strengthen the resilience of 3,000 farming households in two western districts of Timor-Leste (Liquica and Bobonaro) thereby contributing to GoTL's food security policy. **Note:** this is the successful seed production model which SoL III intends to use and scale-up for its community seed production groups (CSPGs). **Relevance to SoL III:** (i) Potential user of SoL III seed: Yes – already using maize (very successful farmer-based seed multiplication and storage) – considerable potential to also use other SoL varieties – and good partner for development of SoL's proposed farmer seed marketing groups (FSMGs) (ii) Possible source of seed skills: Yes – for farmer-based seed production and storage systems		

(iii) Possible budget sharing (for SOEs): Limited (iv) Specific skills for SOE training: Yes - Project works with SEOs, and its own facilitators; and has excellent experience with SOEs, seed group formation, and seed production training (v) Other: A very important partner for SoL III as the Program will be building on CARE's success with CSPGs, and learning from its experiences with FSMGs

Project title: Agricultural Productivity Improvement Project (APIP) (World Bank)		
Coverage: National	Budget: US$ not known – but could be US$50 million over 20 years	Duration: Not known, but needs to extend over at least 10 years
Description: Still at concept stage, based on increasing the productivity of all of Timor-Leste's main agricultural products (crops and livestock). Concept is to develop a national extension program based on training and resourcing MAF's fledgling agricultural extension service, and ensuring coordination between all development partners engaged in the agricultural sector **Relevance to SoL III:** Not known as design has not started; but if GoTL's requests assistance with Program design it is expected that APIP will contribute considerably to the evolution of MAF's extension system. This would be of considerable benefit to SoL III, particularly if the Program could convince GoTL of the value of and returns from additional investment in MAF's operational budget, with the objective of improving the performance and impact of the SEOs.		

Project title: Timor Economic Rehabilitation and Development Project (USAID)		
Coverage: Dili, Liquica, Aileu, Ermera, Covalima, Manufahi, Oecusse, Baucau, Bobonaro.	Budget: US$17.5 million	Duration: 2002-10
Description: NCBA. The aim is to build on previous success with coffee to diversify the income sources of Cooperative Café Timor (CCT) members to include livestock, vanilla, cloves, agro-forestry products, etc. Also includes the Private Sector Development Project which focuses on coffee rehabilitation, agricultural diversification and market chain development **Relevance to SoL III:** (i) Potential user of SoL III seed: Limited, except in areas which remain dependent on rice, maize, roots and tubers (ii) Possible source of seed skills: None (iii) Possible budget sharing (for SOEs): None – only focussing on the private sector (iv) Specific skills for SOE training: Limited – the Project has limited involvement with these staff (v) Other: None		

Project title: Irrigation and Rice Cultivation Project in Manatuto (JICA)		
Coverage: Manatuto	Budget: US$9.1 million for construction and US$2.8 for water-user's associations	Duration: 2005-10
Description: Following construction of the Laclo Irrigation Scheme (US$9.1 million), the		

Project aims develops the capacity of the water users' associations and increase rice productivity.

Relevance to SoL III:

(i) Potential user of SoL III seed: Yes – especially use of Nakroma rice variety, plus new varieties in the pipe-line; and in the future, use of second crop legumes on paddy land
(ii) Possible source of seed skills: None
(iii) Possible budget sharing (for SOEs): None
(iv) Specific skills for SOE training: Limited
(v) Other: None

Project title: Project for Rehabilitation and Improvement of Maliana I Irrigation System (JICA)		
Coverage: Bobonaro	Budget: US$6.6 million	Duration: 2008-2009 - Completed

Description: Rehabilitation of Maliana I Irrigation System to cover about 1,000ha in Maliana area, in Bobonaro District.

Relevance to SoL III:

(i) Potential user of SoL III seed: Yes - especially use of Nakroma rice variety, plus new varieties in the pipe-line; and in the future, use of second crop legumes on paddy land
(ii) Possible source of seed skills: None
(iii) Possible budget sharing (for SOEs): None
(iv) Specific skills for SOE training: Limited
(v) Other: None

Project title: Initiative on Soaring Food Prices (FAO)		
Coverage: National	Budget: US$1.2 million	Duration: 2008-10

Description: Aim is to boost agricultural domestic food production during the main and second agriculture seasons by providing quality inputs (seeds, fertilizer, silos, and post-harvest machinery).

Relevance to SoL III:

(i) Potential user of SoL III seed: Yes – all SoL varieties can contribute to this national objective
(ii) Possible source of seed skills: Limited
(iii) Possible budget sharing (for SOEs): None
(iv) Specific skills for SOE training: Limited
(v) Other: None

Project title: Post crisis rehabilitation of food security and livelihoods of most vulnerable population in the district of Baucau (Spanish Co-operation – implemented by FAO)		
Coverage: Baucau	Budget: US$1.5 million	Duration: 2009-2011

Description: The project will contribute to enhancing food security, nutritional status and rural incomes amongst rural communities in Baucau District through improved crop seed varieties, storage silos for post harvest loss reduction, use of rehabilitated irrigation sites, home garden and small scale livestock raising, and group formation for rural participation in sustainable development of the agricultural sector. The Project will target, in particular, communities around the Seisal river valley and close-by upland communities.

Relevance to SoL III:

(i) Potential user of SoL III seed: Yes – for all of SoL's food crop varieties
(ii) Possible source of seed skills: None
(iii) Possible budget sharing (for SOEs): Possible, as the Project works through SEOs
(iv) Specific skills for SOE training: Limited – but experience of implementing through SOEs will be useful, as would working with farmer groups
(v) Other: Useful for SoL to monitor results of this intensive approach to rural development

Project title: Reductions of post harvest losses (NZAid - implemented by FAO)		
Coverage: National	Budget: US$0.6 million	Duration: 2008-2009 extended

Description: The Project aims to assist GoTL to improve food security by reducing post harvest losses and improving household storage capacities. Based on the introduction of simple post harvest technology, improved storage technology, and the establishment of local grain storage silo production capacity.

Relevance to SoL III:

(i) Potential user of SoL III seed: Not directly – but improved on-farm storage is a logical next step for SoL
(ii) Possible source of seed skills: Limited
(iii) Possible budget sharing (for SOEs): None
(iv) Specific skills for SOE training: Yes - outcomes from grain storage activities will be useful as SoL's potential maize varieties are all tested for storability, before release
(v) Other: In the longer-term, could be a good partner for a major, nation-wide food storage program

Project title: Support to Coffee Growers (JICA)		
Coverage: Maubisse	Budget: US$ not known	Duration: 2009-12

Description: Aim is to expand co-operatives, improve coffee production and diversify into other crops.

Relevance to SoL III:

(i) Potential user of SoL III seed: Yes – as most coffee growers also grow upland food crops (maize, roots and tubers), and Timor-Leste coffee growing areas are amongst the poorest in the country
(ii) Possible source of seed skills: No
(iii) Possible budget sharing (for SOEs): No
(iv) Specific skills for SOE training: Limited
(v) Other: Could be a partner (along the lines of the agreement with PADRTL) for distributing SoL seed into the coffee areas

Project title: Livestock Development Project (ACIAR) - planned		
Coverage: Not decided	Budget: US$1.1 million	Duration: 2011 - 2014

Description: Adaptive research into cattle and pig nutrition and management under Timor-Leste conditions. Expected to test production systems developed in NTT and Eastern Indonesia under similar projects. SoL commenced as a small Project like the proposed

Livestock Development Project and eventually evolved into a national Program, so there are some expectations for a similar outcome for the latter.

Relevance to SoL III:

(i) Potential user of SoL III seed: Possibly – in crop/pasture rotations
(ii) Possible source of seed skills: None
(iii) Possible budget sharing (for SOEs): None – will have own budget
(iv) Specific skills for SOE training: Limited at this stage
(v) Other: Yes – expected to share some research station facilities (Betano and Loess) and could conduct some joint research on food crop/animal production systems

Project title: Rural Development in Liquica Project (AECID) (Spanish Aid)		
Coverage: Liquica	Budget: US$1.7 million	Duration: 2008 - 2010

Description: Project will focus on food security

Relevance to SoL III:

(i) Potential user of SoL III seed: Yes – due to focus on food security and potential of SoL's varieties to increase production – already working with SoL on such program
(ii) Possible source of seed skills: Yes – good experience working with poor farmers
(iii) Possible budget sharing (for SOEs): No – budget is limited
(iv) Specific skills for SOE training: Some – Project works through MAF's SEO, sub-district and district staff
(v) Other: Experience with channelling funds through MAF's financial management systems; understand the problems and issues with this approach, and able to advise on issues and challenges.

Project title: Bio-Security Strengthening Project (AusAID – FAO implemented)		
Coverage: National with focus on western border	Budget: US$3.8 million	Duration: 2008 - 2010

Description: Focuses on prevention and control of avian influenza and other epizootic diseases, and more broadly is assisting MAF to develop its quarantine procedures and regulations to facilitate trade with Indonesia. This includes the construction of an international standard laboratory in Dili, plus operational training

Relevance to SoL III: Very little, except for quarantine requirements for the importation of seed and planting materials.

Project title: Rural Development Program, Phase II (EC-funded and GTZ implemented)		
Coverage: Bobonaro, Covalima	Budget: US$19.4 million	Duration: 2006 – 2010 + extension

Description: The Project focuses on agricultural extension services, agribusiness and rural roads.

Relevance to SoL III:

(i) Potential user of SoL III seed: Yes – already using improved rice varieties and will move into upland crops (maize, peanuts, cassava and sweet potato) in final 2 years
(ii) Possible source of seed skills: Limited
(iii) Possible budget sharing (for SOEs): Yes – works closely with SEOs in target districts and is embedded in MAF's district offices
(iv) Specific skills for SOE training: Yes – considerable experience with initial training of MAF's 376 SEOs when first assigned, and is continuing to train and

skill these staff

(v) Other: Good potential to cooperate at district and MAF Dili-level as RDP III has a Policy and Planning Advisor attached to MAF's National Directorate of policy and planning. Therefore good possibilities for cooperative capacity building within MAF Dili

Project title: Rural Development Program, Phase III (EC-funded and implemented by Landell Mills)		
Coverage: Manufahi	Budget: US$8.0 million	Duration: 2009 - 2014

Description: The Project focuses on agricultural extension services, agribusiness and rural roads, and is embedded in MAF's district office

Relevance to SoL III:

(i) Potential user of SoL III seed: Yes – for all species
(ii) Possible source of seed skills: Limited
(iii) Possible budget sharing (for SOEs): Possible, but only in Manufahi
(iv) Specific skills for SOE training: Yes – working closely with SEOs in Manufahi
(v) Other: Yes – good experience of problems associated with lines of command within MAF (from field-level back to directorates in Dili rather than through District Directors)

Project title: Rural Development Program, Phase IV (EC-funded and possibly implemented by GTZ) – currently under design		
Coverage: various districts depending on whether focus is rural roads or agricultural extension	Budget: About US$55.0 million for rural roads and agricultural extension (US$ 8.0 million for the latter)	Duration: 20011 - 2016

Description: The Project focuses on strengthen agricultural education and extension services at all levels within MAF; and rehabilitation of rural and access roads

Relevance to SoL III:

(i) Potential user of SoL III seed: Depends on final design, could be a excellent partner if the Program decides to support agricultural extension down to the farm-level
(ii) Possible source of seed skills: Limited
(iii) Possible budget sharing (for SOEs): Yes – definitely – need more details on final design but should be good opportunities to leverage budget support for SEO training and operational funding
(iv) Specific skills for SOE training: Yes – these will be developed as part of the strengthening MAF's extension service and should be accessible to SoL III
(v) Other: Not yet clear – depends on final design – but good potential for close cooperation for capacity building within all levels of MAF

Project title: Promoting Rural Development Project (GTZ-funded and implemented)		
Coverage: Baucau	Budget: US$5.9 million	Duration: 2006 – 2011

Description: Initially this was a food security and disaster response Project which evolved into a general agricultural development project – with a focus on irrigated rice and agri-business

Relevance to SoL III:

(i)	Potential user of SoL III seed: Yes – developed ICM and SRI rice production systems under this Project - already using improved rice varieties (Nakroma) and peanut (Utamua)
(ii)	Possible source of seed skills: Limited
(iii)	Possible budget sharing (for SOEs): Yes – works closely with SEOs in target districts and is embedded in MAF's district office
(iv)	Specific skills for SOE training: Yes – considerable experience with initial training of SEOs and is continuing to train and skill these staff
(v)	Other: Project is coming to an end, but still good opportunities for promotion of SoL varieties; and GTZ is a valuable long-term partner for SoL

Project title: Community-Based Watershed Management Planning Project (JICA-funded and implemented)		
Coverage: Comoro and Laclo watersheds	Budget: US$2.4 million	Duration: 2005 - 2010
Description: Watershed management (development) Project **Relevance to SoL III:** (i) Potential user of SoL III seed: Yes – especially upland rainfed species which have potential to reduce rainfall runoff and erosion (mainly legumes) (ii) Possible source of seed skills: Limited (iii) Possible budget sharing (for SOEs): Doubtful (iv) Specific skills for SOE training: Limited (v) Other: None		

Project title: One Village, One Product Project (JICA funded)		
Coverage: not known	Budget: US$1.9 million	Duration: 2008 - 2010
Description: Promotion of concept that villages specialise in certain products (one only) **Relevance to SoL III:** (i) Potential user of SoL III seed: Doubtful – focussing on high value crops (ii) Possible source of seed skills: None (iii) Possible budget sharing (for SOEs): None (iv) Specific skills for SOE training: None – considered to be very risky to encourage villages to move away from crop and livestock diversity (v) Other: Very limited		

Project title: Promoting Sustainable Food and Nutrition Security in Timor-Leste Project (MDG/F-funded and FAO, UNICEF, WFP and WHO-implemented)		
Coverage: Not known	Budget: US$4.0 million	Duration: 2010 - 2012
Description: Aims to increase the sustainable production of food crops in some of Timor-Leste's poorest rural areas. **Relevance to SoL III:** (vi) Potential user of SoL III seed: Yes, as SoL's varieties increase food production considerably (vii) Possible source of seed skills: None (viii) Possible budget sharing (for SOEs): None (ix) Specific skills for SOE training: None: (x) Other: Not known		

Project title: Support to Coffee Growers Project (JICA-funded)		
Coverage: not known – probably Ermera	Budget: US$ million (not known)	Duration: 2009 - 2112
Description: No details available **Relevance to SoL III:** (vi) Potential user of SoL III seed: Possible – if the Project also focuses on assisting poor coffee growers with upland food crop production (maize and mixed roots and tubers) (vii) Possible source of seed skills: Limited (viii) Possible budget sharing (for SOEs): No (ix) Specific skills for SOE training: Possible (x) Other: Limited		

Project title: Community Mobilization for Poverty Alleviation and Social Inclusion in Service Delivery Project (UN Trust Fund for Human Society-funded; and FAO, ILO, UNDP, UNFPA, UNICEF and WFP- implemented)		
Coverage: not know	Budget: US$ 0.62million	Duration: 2010 - 2112
Description: Not available **Relevance to SoL III:** Not known		

Project title: Sustainable Land Management Project (GEF- and UNDP-funded/UNDP implemented		
Coverage: Not know – thought to be generic planning rather than action in districts	Budget: US$0.5 million	Duration: 2007 - 2010
Description: Details not available **Relevance to SoL III:** (i) Potential user of SoL III seed: Limited – but identification of sprawling and climbing legumes (for human and animal food) by SoL III, and which reduce soil erosion, could assist this Project (ii) Possible source of seed skills: None (iii) Possible budget sharing (for SOEs): None (iv) Specific skills for SOE training: Possibly for land use management and conservation agricultural practices (v) Other: Doubtful		

On-going and Rural Development Planned Projects by District

Farming and Food Production.	National	Ainaro	Aileu	Baucau	Bobonaro	Covalima	Dili	Ermera	Lautem	Liquiça	Manufahi	Manatuto	Oecusse	Viqueque
1. PADRTL RDP			●		●	●		●		●	●			
2. Oxfam - Food Security Prog.						●							●	
3. World Neighbours - Food Security													●	
4. Concern - Food Security Program									●		●			
5. CCF - Food Security									●			●		
6. CARE - Food Security Project					●					●				
7. World Bank – Ag Productivity	●													
8. USAID – Economic Rehabilitation		●					●			●				
9. JICA - Irrigation Project Manatuto											●			
10. JICA - Irrigation Rehab Maliana					●									
11. FAO - Food Prices Project	●													
12. Spanish – Food Security/Post Crisis				●										
13. NZAid – Post Harvest Losses	●													
14. JICA – Support for Coffee Growers		●												
15. ACIAR - Livestock Dev. Project	●													
16. Spanish – Rural Dev. in Liquica										●				
17. AusAID – Biosecurity	●													
18. EC- RDP II											●			
19. EC – RDP III														
20. EC – RDP IV (under preparation)														
21. GTZ – Rural Development Program					●									
22. JICA – Community Watershed							●				●			
23. JICA - One Village One Product		●		●			●			●				
24. Various Donors – Food & Nutrition		●												
25. UNDP – Sustainable Land Manag't	●													

APPENDIX 5

PROGRAM COST ESTIMATES, STAFFING AND RESOURCES SCHEDULE

List of Tables

Table 1: Summary of Program Costs by Component and Year (A$'000)

		(A$'000)	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Component 1	Australia	Staff	$347.24	$357.65	$368.38	$379.43	$390.82	$1,843.52
	Australia	Costs	$518.00	$533.00	$533.00	$216.50		$1,800.50
	Timor-Leste	Staff	$107.97	$107.97	$107.97	$107.97	$107.97	$539.85
	Timor-Leste	Costs				$216.50	$433.00	$649.50
		Total	$973.21	$998.62	$1,009.35	$920.40	$931.79	$4,833.37
Component 2	Australia	Staff	$270.28	$278.38	$286.74	$295.34	$304.20	$1,434.93
	Australia	Costs	$714.50	$682.00	$679.50	$366.00		$2,442.00
	Timor-Leste	Staff	$41.97	$43.14	$41.97	$41.97	$41.97	$211.02
	Timor-Leste	Costs				$366.00	$732.00	$1,098.00
		Total	$1,026.75	$1,003.52	$1,008.21	$1,069.31	$1,078.17	$5,185.95
Component 3	Australia	Staff	$364.94	$372.10	$381.19	$390.56	$366.50	$1,875.29
	Australia	Costs	$149.00	$253.75	$269.75	$272.75	$275.75	$1,221.00
	Timor-Leste	Staff	$30.06	$30.06	$30.06	$30.06	$30.06	$150.30
		Total	$544.00	$655.91	$681.00	$693.37	$672.31	$3,246.59
Component 4	Australia	Staff	$791.47	$775.86	$727.05	$528.17	$508.04	$3,330.59
	Australia	Costs	$331.50	$306.50	$306.50	$306.50	$291.50	$1,542.50
	Timor-Leste	Staff	$33.00	$33.18	$33.00	$33.00	$33.00	$165.18
		Total	$1,155.97	$1,115.54	$1,066.55	$867.67	$832.54	$5,038.27
Component 5	Australia	Staff	$593.39	$605.63	$618.24	$563.83	$526.65	$2,907.74
	Australia	Timor-Leste Staff	$178.80	$178.80	$178.80	$178.80	$178.80	$894.00
	Australia	Costs	$2,136.30	$727.30	$1,372.30	$727.30	$745.30	$5,708.50
		Total	$2,908.49	$1,511.73	$2,169.34	$1,469.93	$1,450.75	$9,510.24
Program Total	Australia	Staff	$2,367.31	$2,389.63	$2,381.60	$2,157.33	$2,096.21	$11,392.07
	Australia	Timor-Leste Staff	$178.80	$178.80	$178.80	$178.80	$178.80	$894.00
	Australia	Costs	$3,849.30	$2,502.55	$3,161.05	$1,889.05	$1,312.55	$12,714.50
	Total - Australia		$6,395.41	$5,070.98	$5,721.45	$4,225.18	$3,587.56	$25,000.57
	Timor-Leste	Staff	$213.00	$214.35	$213.00	$213.00	$213.00	$1,066.35
		Costs				$582.50	$1,165.00	$1,747.50
	Total - Timor-Leste		$213.00	$214.35	$213.00	$795.50	$1,378.00	$2,813.85
		TOTAL	$6,608.41	$5,285.33	$5,934.45	$5,020.68	$4,965.56	$27,814.42
		Estimated Timorese Costs (US$'000)						
			Year 1	Year 2	Year 3	Year 4	Year 5	Total
		All Timorese Staff	$181.05	$182.20	$181.05	$181.05	$181.05	$906.40
		Tim. Costs Cpt 1				$184.03	$368.05	$552.08
	(US$'000)	Tim. Costs Cpt 2				$311.10	$622.20	$933.30
	0.85	Total (US$'000)	$181.05	$182.20	$181.05	$676.18	$1,171.30	$2,391.77

Appendix 5: Program Cost Estimates, Staffing and Resources Schedule

Table 2. Staffing schedule

						Year 1				Year 2				Year 3				Year 4				Year 5			
Ref	Component/Output	Unit	No.	% time	Total	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
C1	Evaluation of improved foodcrop varieties																								
O1.1	Establishment of National Research Centres and Stations completed																								
Int	LT Research Advisor (RA)	Pers Month	1	5%	3	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Int		Pers Month																							
TL		Pers Month																							
TL		Pers Month																							
O1.2	Genetic material of potential improved varieties identified and sourced																								
Int	LT Research Advisor (RA)	Pers Month	1	5%	3	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Int		Pers Month																							
TL		Pers Month																							
TL		Pers Month																							
O1.3	Potential new varieties evaluated on-station																								
Int	LT Research Advisor (RA)	Pers Month	1	15%	9	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
Int		Pers Month																							
TL	On-Station Research Officers (7 now + 4 PIII - +3 Res Stations)	Pers Month	11	100%	660	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00
O1.4	Potential new varieties evaluated on-farm																								
Int	LT Research Advisor (RA)	Pers Month	1	25%	15	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Int	LT Regional Advisor No 1 (RA1)	Pers Month	1	33%	19.8	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Int	LT Regional Advisor No 2 (RA2)	Pers Month	1	33%	19.8	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Int	LT Regional Advisor No 3 (RA3)	Pers Month	1	33%	19.8	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
TL	LT Regional Coordinator No 1 (RC1) (new)	Pers Month	1	33%	19.8	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
TL	LT Regional Coordinator No 2 (RC2) (new)	Pers Month	1	33%	19.8	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
TL	LT Regional Coordinator No 3 (RC3) (new)	Pers Month	1	33%	19.8	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
TL	OFDT Officers (OFDTO) - (have 17, no increase)	Pers Month	17	100%	1020	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00
TL	OFDT Coordinators (OFDTC) (2 now - +2 PIII)	Pers Month	4	100%	240	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
O1.5	Selected new varieties officially released																								
Int	LT Research Advisor (RA)	Pers Month	1	5%	3	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Int		Pers Month																							
TL		Pers Month																							
TL		Pers Month																							
O1.6	Sufficient basic and foundation seed being produced																								
Int	LT Research Advisor (RA)	Pers Month	1	15%	9	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
Int		Pers Month																							
TL	Pure Seed Officers (PSO) (1 now - +2 PIII)	Pers Month	3	100%	180	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
TL		Pers Month																							
O1.7	Capacity of MAF staff to manage the identification and release of new varieties																								
Int	LT Research Advisor (RA)	Pers Month	1	30%	18	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90

Table 2. Staffing schedule

						Year 1				Year 2				Year 3				Year 4				Year 5			
Ref	Component/Output	Unit	No.	% time	Total	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
C2	Formal seed production and distribution																								
O2.1	Formal seed being produced through farmer contracts																								
Int	LT Formal Seed Production Advisor (FSPA)	Pers Month	1	10%	6	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Int		Pers Month																							
TL	Seed Production Coordinator (SPC) (1 now - +0 PIII)	Pers Month	1	100%	60	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
TL	Seed Production Officers (SPO) (7 now - +5 PIII) (0 for veg - Dist)	Pers Month	12	100%	720	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00
O2.2	Quality assurance systems established																								
Int	LT Formal Seed Production Advisor (FSPA)	Pers Month	1	10%	6	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Int		Pers Month																							
TL		Pers Month																							
TL		Pers Month																							
O2.3	Technical extension support provided to contracted seed producers																								
Int	LT Formal Seed Production Advisor (FSPA)	Pers Month	1	10%	6	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Int	LT Regional Advisor No 1 (RA1)	Pers Month	1	33%	19.8	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Int	LT Regional Advisor No 2 (RA2)	Pers Month	1	33%	19.8	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Int	LT Regional Advisor No 3 (RA3)	Pers Month	1	33%	19.8	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
TL	LT Regional Coordinator No 1 (RC1) (new)	Pers Month	1	33%	19.8	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
TL	LT Regional Coordinator No 2 (RC2) (new)	Pers Month	1	33%	19.8	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
TL	LT Regional Coordinator No 3 (RC3) (new)	Pers Month	1	33%	19.8	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
O2.4	Seed grading, packaging and storage facilities established																								
Int	LT Formal Seed Production Advisor (FSPA)	Pers Month	1	10%	6	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Int		Pers Month																							
TL		Pers Month																							
TL		Pers Month																							
O2.5	Formal seed distributed through preferred distribution channels																								
Int	LT Formal Seed Production Advisor (FSPA)	Pers Month	1	10%	6	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Int		Pers Month																							
TL		Pers Month																							
TL		Pers Month																							
O2.6	Capacity of MAF staff to manage the production and distribution of formal seed																								
Int	LT Formal Seed Production Advisor (FSPA)	Pers Month	1	10%	6	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30

Appendix 5: Program Cost Estimates, Staffing and Resources Schedule

Table 2. Staffing schedule

						Year 1				Year 2				Year 3				Year 4				Year 5			
Ref	Component/Output	Unit	No.	% time	Total	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
C3	Informal seed production and distribution																								
O3.1	Community Seed Production Groups (CSPGs) established																								
Int	LT Informal Seed Production Advisor (ISPA)	Pers. Month	1	20%	12.00	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Int	ST Farmer Group Specialist (FGS)	Pers Month			3.00						1.00				1.00				1.00						
Int	LT Regional Advisor No 1 (RA1)	Pers Month	1	33%	19.8	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Int	LT Regional Advisor No 2 (RA2)	Pers Month	1	33%	19.8	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Int	LT Regional Advisor No 3 (RA3)	Pers Month	1	33%	19.8	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
TL	LT Regional Coordinator No 1 (RC1) (new)	Pers Month	1	33%	19.8	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
TL	LT Regional Coordinator No 2 (RC2) (new)	Pers Month	1	33%	19.8	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
TL	LT Regional Coordinator No 3 (RC3) (new)	Pers Month	1	33%	19.8	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
TL	Community-Based Seed Production Coordinator (CBSPC)	Pers Month	9	100%	540	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00
TL		Pers Month																							
O3.2	Farmer Seed Marketing Groups established																								
Int	LT Informal Seed Production Advisor (ISPA)	Pers. Month	1	5%	3	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Int	ST Seed Value Chain Specialist (SVCS)	Pers Month			3			1.00				0.50				0.50				0.50				0.50	
O3.3	Focal seed merchants in local markets established																								
Int	LT Informal Seed Production Advisor (ISPA)	Pers. Month	1	5%	3	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Int	ST Seed Value Chain Specialist (SVCS)	Pers Month			3			1.00				0.50				0.50				0.50				0.50	
O3.4	Access to seed for vulnerable groups improved through vouchers and seed																								
Int	LT Informal Seed Production Advisor (ISPA)	Pers. Month	1	5%	3	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
O3.5	Systems linking informal seed producers with potential buyers																								
Int	LT Informal Seed Production Advisor (ISPA)	Pers. Month	1	5%	3	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15

Table 2. Staffing schedule

						Year 1				Year 2				Year 3				Year 4				Year 5			
Ref	Component/Output	Unit	No.	% time	Total	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
C4	Seed system management																								
O4.1	Seed planning and management systems established																								
Int	LT SoL Team Leader (SoLTL)	Pers. Month	1	5%	3	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Int	LT Formal Seed Production Advisor (FSPA)	Pers Month	1	10%	6	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Int	LT Informal Seed Production Advisor (ISPA)	Pers Month	1	10%	6	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
O4.2	M&E systems established providing a basis for progressive learning																								
Int	LT SoL Team Leader (SoLTL)	Pers. Month	1	5%	3	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Int	LT M&E/SOSEK Advisor (M&E/SA)	Pers Month	1	100%	36	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00								
Int	ST M&E Specialist (STM&ES)	Pers Month			9		2.00		1.00		1.00		1.00		1.00				1.00				1.00		1.00
Int	LT Formal Seed Production Advisor (FSPA)	Pers Month	1	10%	6	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Int	LT Informal Seed Production Advisor (ISPA)	Pers Month	1	10%	6	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
TL	LT SOSEK Staff (LTSS) (have 2 + 2 for PIII)2	Pers Month	4	100%	240	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
TL		Pers Month																							
O4.3	GoTL seed policy being informed by SoL experience																								
Int	LT SoL Team Leader (SoLTL)	Pers. Month	1	5%	3	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Int	LT Formal Seed Production Advisor (FSPA)	Pers Month	1	10%	6	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Int	LT Informal Seed Production Advisor (ISPA)	Pers Month	1	10%	6	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
O4.4	Seed system gender strategy implemented																								
Int	LT SoL Team Leader (SoLTL)	Pers. Month	1	5%	3	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Int	ST Gender Specialist (GS)	Pers Month	1	100%	10		4.00				3.00				2.00				1.00						
TL	LT Gender Officer (GO)	Pers Month	1	100%	60	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
O4.5	Improved variety technical and promotional materials developed																								
Int	LT SoL Team Leader (SoLTL)	Pers. Month	1	5%	3	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Int	LT Formal Seed Production Advisor (FSPA)	Pers Month	1	10%	6	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
O4.6	Awareness of improved varieties increased																								
Int	LT SoL Team Leader (SoLTL)	Pers. Month	1	5%	3	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Int	LT Formal Seed Production Advisor (FSPA)	Pers Month	1	10%	6	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
O4.7	Environmental and climate change impacts addressed																								
Int	Climate Change Advisor (CCA) (funded from other source Yr 1)	Pers. Month	1	100%	36	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00								
Int	LT SoL Team Leader (SoLTL)	Pers Month	1	5%	3	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Int	ST Environmental Specialist (ES)	Pers Month			3						1.00				1.00				1.00						
O4.8	Capacity of MAF staff to manage the national seed system enhanced																								
Int	LT SoL Team Leader (SoLTL)	Pers. Month	1	5%	3	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
TL	National Program Manager - NPM (C/P for SoLTL) (MAF salary)	Pers Month	1	100%	60	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
TL	Training Coordinator (TC)	Pers Month	1	100%	60	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Appendix 5: Program Cost Estimates, Staffing and Resources Schedule

Table 2. Staffing schedule

						Year 1				Year 2				Year 3				Year 4				Year 5			
Ref	Component/Output	Unit	No.	% time	Total	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
C5	Program management and coordination																								
O5.1	Management and coordination																								
Int	LT SoL Team Leader (SoLTL)	Pers. Month	1	60%	36	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
Int	LT Office Manager (OM)	Pers. Month	1	100%	60	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Int	ST Australian Program Coordinator (APC) (150 days/year)	Pers. Month	1	100%	30	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
Int	Unallocated Short Term TA	Pers. Month	1	100%	16		2.00		2.00		2.00		2.00		2.00		2.00		2.00		2.00				
TL	Translator/Interpreter (TI)	Pers. Month	2	100%	120	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
TL	Admin Assistants (AAs)	Pers. Month	4	100%	240	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
TL	Finance Officer (FO)	Pers. Month	4	100%	240	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
TL	Data-base Entry Specialist (DBES)	Pers. Month	3	100%	180	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
TL	Drivers (DR)	Pers. Month	23	100%	1380	69.00	69.00	69.00	69.00	69.00	69.00	69.00	69.00	69.00	69.00	69.00	69.00	69.00	69.00	69.00	69.00	69.00	69.00	69.00	69.00
TL	Office Cleaner (OC)	Pers. Month	1	100%	60	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Appendix 5: Program Cost Estimates, Staffing and Resources Schedule

Table 3: Resources Schedule

					Year 1				Year 2				Year 3				Year 4				Year 5			
Ref	Component/Output	Unit	$/Unit	Total	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
C1	Evaluation of improved foodcrop varieties																							
O1.1	Establishment of National Research Centres and Stations completed																							
O1.1.1	Irrigation system for Loess Research Centre	System	$50,000	1	1																			
O1.1.2	Additional Research Stations	Centre	$100,000	3	1				1				1											
O1.2	Genetic material of potential improved varieties identified and sourced																							
O1.2.1	ST visits by CGIAR specialists (3/year) (tech and training)	Visit	$10,000	15		1	1	1	1	1	1		1	1	1		1	1	1		1	1	1	
O1.3	Potential new varieties evaluated on-station																							
O1.3.1	Operations at Betano and Loess	Year	$120,000	5	1				1				1				1				1			
O1.3.2	Operations at new upland Research Stations (2) ($2,000/mth)	Year	$50,000	4					1				1				1				1			
O1.3.3	Operations at new irrigated Research Station ($2,000/mth)	Year	$25,000	4					1				1				1				1			
O1.4	Potential new varieties evaluated on-farm																							
O1.4.1	Cost of OFDTs (excluding staff time) (pds, equip, etc.)	OFDT	$150	3500	175	175	175	175	175	175	175	175	175	175	175	175	175	175	175	175	175	175	175	175
O1.4.2	Support for SEOs to assist with OFDTs	Year	$10,000	5	1				1				1				1				1			
O1.5	Selected new varieties officially released																							
O1.5.1	Variety launch events and promotional events	Year	$10,000	5			1				1				1				1				1	
O1.6	Sufficient basic and foundation seed being produced																							
O1.6.1	Building for potato storage		$10,000	1	1																			
O1.7	Capacity of MAF staff to manage the identification and release of new varieties strengthened																							
O1.7.1	Masters Degree study (international) (1, 3 yrs, LS $240,000)	Year	$80,000																					
O1.7.2	On-the-job training (visits to int'l res. centres) - 2 mnths		$15,000	5		1				1				1				1				1		
O1.7.3	Short courses run by CGIAR pers. In TL (no inc. cost)																							
O1.7.4	In-country short courses (15-25 pp, 1 week) (1 course/qtr)	Course	$8,500	40	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

					Year 1				Year 2				Year 3				Year 4				Year 5			
Ref	Component/Output	Unit	$/Unit	Total	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
C2	**Formal seed production and distribution**																							
O2.1	Formal seed being produced through farmer contracts				(Seed production phased over 3 years)																			
	Local seed stores - use MAF's extension centres																							
O2.1.1	Purchased rice seed ($0.50/kg)	Mt	$500	250	50				50				50				50				50			
O2.1.2	Purchased maize ($0.50/kg)	Mt	$500	350	25				50				75				100				100			
O2.1.3	Purchased peanut seed ($1.00/kg)	Mt	$1,000	125	25				25				25				25				25			
O2.1.4	Operating sweet potato cutting sites (30 x 0.05 ha sites)	Site	$500	150	30				30				30				30				30			
O2.1.5	Operating cassava cane sites (1 ha/district) (replace 3 sites/yr)	ha	$5,000	27	15				3				3				3				3			
O2.1.6	All other crops (legumes, winter cereals, etc.)	Lump Sum/Yr	$50,000	4	0.5				0.5				1				1				1			
			Total Seed (Mt) ---		100				125				150				175				175			
O2.2	Quality assurance systems established																							
O2.2.1	Seed laboratory equipment	Lump Sum	$25,000	1			1																	
O2.3	Technical extension support provided to contracted seed producers																							
O2.3.1	Covered in O2.6																							
O2.4	Seed grading, packaging and storage facilities established				(Labour and packaging costs phased over 3 years)																			
O2.4.1	Additional Seed Processing Centres (have 2)	Centre	$80,000	2	1				1															
O2.4.2	Annual operating & R&M Seed Centres (15% of cost)	Lump Sum/Yr	$12,000	20	4				4				4				4				4			
O2.4.3	Annual labour, seed packaging costs, etc.	Mt	$1,000	725	100				125				150				175				175			
O2.5	Formal seed distributed through preferred distribution channels																							
O2.5.1	Seed distribution (some contracted, plus cooperation with MAF districts)	Mt	$600.00	725	100				125				150				175				175			
O2.5.2	Cassava cane distribution (by local staff)	Mt	$200.00	500		100				100				100				100				100		
O2.5.3	Sweet potato cutting distribution (some by local staff)	Mt	$300.00	1000		200				200				200				200				200		
																	No of Dist staff -->				**80**			
O2.6	Capacity of MAF staff to manage the production and distribution of formal seed				(no phasing of SEOs or District staff)												No of SEOs/yr -->				320			
O2.6.1	Masters Degree study (international) (1, 3 yrs, LS $240,000)	Year	$80,000																					
O2.6.2	On-the-job training (visits to int'l seed centres) - 2 mnths	Visit	$15,000	10		2				2				2				2				2		
O2.6.3	In-country short courses (15-25 pp, 1 week) (1 course/qtr)	Course	$8,500	20	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
O2.6.4	Seed/agronomy/gender training for SEOs	LS/pp/yr	$100	1600	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
O2.6.5	Operational costs for SEOs	LS/pp/yr	$100	1600	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
O2.6.6	Seed/agronomy/gender training for Dist & SD staff (80 pp)	LS/pp/yr	$100	400	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
O2.6.7	Operational costs for Dist & SD staff (80 pp)	LS/pp/yr	$100	400	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20

					Year 1				Year 2				Year 3				Year 4				Year 5			
Ref	Component/Output	Unit	$/Unit	Total	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
C3	Informal seed production and distribution				(Based on 1 CSPG/2 SEOs/yr, with support for 2 years)												No of SEOs/yr -->				**320**			
O3.1	Community Seed Production Groups (CSPGs) established				(Exc. cost of SEO/district training & operations - see O3.6)																			
O3.1.1	Community Seed Production Groups (CSPGs) established	No. gps/yr -->		1000					250				250				250				250			
	(See separate spread sheet for phasing)	Av cost/group	$355																					
O3.2	Farmer Seed Marketing Groups established				Lagged 1 year behind estab. of CSPGs																			
O3.2.1	Farmer Seed Marketing Groups established	No. groups starting/yr -->											3				3				3			
	(Small stores, tools, transport, etc.)	Av cost/gp/yr	$3,000																					
O3.3	Focal seed merchants in local markets established				(Based on assistance for 1 merchant/district)																			
O3.3.1	Assistance to sell branded seed in local markets	No. merchants starting/yr --				1				2				3				3				3		
		Cum. No. merchants				1				3				6				9				12		
		Av cost/merch/yr	$1,000																					
O3.4	Access to seed for vulnerable groups improved through vouchers and seed fairs				(Based on 1 fair/year, commencing yr 2)																			
O3.4.1	Lump sum cost of holding an annual seed fair	An L/sum	$10,000	4					1				1				1				1			
O3.5	Systems linking informal seed producers with potential buyers developed																							
O3.5.1	Computer-based record-keeping system	No. districts starting/yr -->				1				2				3				3				3		
		LS/district	$4,000																					
O3.6	Capacity of key actors involved in the production and distribution of informal seed				No of SEOs -->			**320**	No of Dist staff -->				**80**											
O3.6.1	On-the-job training (visits to int'l seed industries) - 2 mnths	Visit	$15,000	10		2				2				2				2				2		
O3.6.2	In-country short courses (15-25 pp, 1 week) (1 course/mth)	Course	$8,500	20	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
O3.6.3	Group/seed/agronomy/gender training for SEOs	LS/pp/yr	$100	1600	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
O3.6.4	Operational costs for SEOs	LS/pp/yr	$100	1600	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
O3.6.5	Group/seed/agronomy/gender training for Dist & SD staff	LS/pp/yr	$100	400	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
O3.6.6	Operational costs for Dist & SD staff	LS/pp/yr	$100	400	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20

					Year 1				Year 2				Year 3				Year 4				Year 5			
Ref	Component/Output	Unit	$/Unit	Total	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
C4	Seed system management																							
O4.1	Seed planning and management systems established																							
O4.1.1	Hard and software	Lump Sum	$25,000	1	1																			
O4.1.2	Training for NDFC&H staff (in-country short courses, 1/yr)	LS/year	$8,500	5		1				1				1				1				1		
	Other training provided on-the-job by Advisors																							
O4.2	M&E systems established providing a basis for progressive learning																							
O4.2.1	Training provided on-the-job by Advisors																							
O4.2.2	SOSEK operations and surveys	LS/year (5 pp)	$48,000	5		1				1				1				1				1		
O4.2.3	Adoption, impact, seed system, seed distribution, etc. surveys	LS/year	$100,000	5		1				1				1				1				1		
O4.3	GoTL seed policy being informed by SoL experience																							
O4.3.1	Experience related to MAF by Advisors and SoL staff																							
O4.4	Seed system gender strategy implemented																							
O4.4.1	Gender awareness training and support programs	LS/year	$50,000	5		1				1				1				1				1		
O4.5	Improved variety technical and promotional materials developed																							
O4.5.1	Lump sum per year	Year	$70,000	5	1				1				1				1				1			
O4.6	Awareness of improved varieties increased																							
O4.6.1	Lump sum/yr	LS/year	$15,000	5	1				1				1				1				1			
O4.7	Environmental and climate change impacts addressed																							
O4.7.1	Costs covered in Research Station operating costs and TA																							
O4.8	Capacity of MAF staff to manage the national seed system enhanced																							
O4.8.1	Intl study tours for exposure to sustainable mature seed systems	Tour	$15,000	4		1				1				1				1						

					Year 1				Year 2				Year 3				Year 4				Year 5			
Ref	Component/Output	Unit	$/Unit	Total	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
C5	**Program management and coordination**																							
O5.1	Management and coordination																							
	Establish Regional Offices (3)																							
O5.1.1	Upgrade office, sundry equipment	Office, etc	$10,000	3	3																			
O5.1.2	Generator (5 kva) (3)	Generator	$6,000	6	3								3											
O5.1.3	District Satellite Dishes (3)	Dish	$6,000	3	3																			
O5.1.4	Regional office operations (3)	Month	$2,000	180	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	Trucks, Vehicles & Motor Bikes - Capital and Ops																							
O5.1.5	Trucks	Vehicle	$45,000		Rented																			
O5.1.6	4 cabs	Vehicle	$45,000	17		12										5								
O5.1.7	2 cabs	Vehicle	$35,000	14		11										3								
O5.1.8	Motor Bikes	Bike	$2,750	132		66										66								
O5.1.9	Transport operational & maintenance (20% of capital)	Qtr	$71,825	20	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
O5.1.10	Extension to Dili Office Building	Building	$100,000	1		1																		
O5.1.11	Communications	Qtr	$12,500	20	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
O5.1.12	Program Reports	Qtr	$6,000	20	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
O5.1.13	Dili and Perth office ops & DG's Fund ($50,000/yr for DG's fund)	Month	$15,000	60	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
	Program Workshops																							
O5.1.14	Program inception workshops (50 pp)	Event	$5,000	3	1	1	1																	
O5.1.15	National annual planning workshops (50 pp)	Event	$10,000	5		1				1				1				1			1			
O5.1.16	District annual planning workshops (50 pp)	Event	$1,500	60		12				12				12				12			12			
O5.1.17	Quarterly district coordination meetings (50 pp)	Event	$1,500	192	12		12	12	12		12	12	12		12	12	12		12	12	12	12	12	12
	Replacement/New Office Equipment																							
O5.1.18	*Dili Office Desk Tops (40)*	Unit	$1,000	40	10	10							10	10										
O5.1.19	*District and Dili Lap Tops (100)*	Unit	$1,500	100	25	25							25	25										
O5.1.20	*Dili Office Printers (4)*	Unit	$2,000	4	2								2											
O5.1.21	*Dili Office Generator (15kva) (1)*	Unit	$6,000	2	1								1											
O5.1.22	*Dili Office Server & Software (1)*	Unit	$4,000	2	1								1											
O5.1.23	*Dili Office Furniture (12)*	Sets	$500	12	12																			
O5.1.24	*Dili Office Photocopier (1)*	Unit	$2,500	2	1								1											
O5.1.25	*Dili Office Network Equipment (1)*	Unit	$4,000	2	1								1											
O5.2	Program publicity																							
O5.2.1	Web-site management	Qtr	$500	20	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
O5.2.2	Program publicity brochures, calendars, etc.	Qtr	$2,500	20	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
O5.2.3	Program signage	Qtr	$500	20	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
O5.2.4	Promotional events	Event	$500	10		1		1		1		1		1		1		1		1		1		1
O5.2.5	Media liaison (International)	Event	$1,000	10		1		1		1		1		1		1		1		1		1		1
O5.2.6	Conference participation	Event	$5,000	10	1		1		1		1		1		1		1		1		1		1	
O5.2.7	Promotional merchandise (non-technical)	Qtr	$1,250	20	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

APPENDIX 6

DRAFT M&E FRAMEWORK

	Intervention Logic	Performance Indicators (PIs)	Means of Verification	Responsibility for data collection	Frequency/deadline	Reporting mechanism
	Goal: Improved food security through increased productivity of major foodcrops.	% increase in production of major staple foodcrops.	Program assessment derived from: • adoption rate data obtained via sample surveys (see below); • MAF production area data for major foodcrops; • incremental yield data obtained via sample surveys and OFDT results.	SOSEK Unit, assisted by M&E Adviser & ST M&E Specialist.	Baseline to be confirmed early in PY1. Re-assessed at end of PYs 3 and 5.	Separate Impact Assessment Report.
	Objective: 46,000 lowland rice farmers and 61,000 upland farmers have access to and are routinely using improved foodcrop varieties.	46,000 (70%) of lowland rice farmers using one or more SoL varieties. 61,000 (40%) of upland farmers using one or more SoL varieties. Within this: - 40% of maize growers are using SoL varieties; - 70% of peanut growers are using SoL varieties; - 50% of sweet potato growers are using SoL varieties; - 20% of cassava growers are using SoL varieties.	Program assessment via adoption rate sample surveys. Baseline confirmed early in PY1. Re-assessed at end of PYs 3 and 5.	SOSEK Unit, assisted by M&E Adviser & ST M&E Specialist.	Baseline confirmed early in PY1. Re-assessed at end of PYs 3 and 5.	Separate Impact Assessment Report.

	Intervention Logic	Draft Performance Indicators (PIs)	Means of Verification	Responsibility for data collection	Frequency/ deadline	Reporting mechanism
COMPONENT 1: EVALUATION OF IMPROVED FOODCROP VARIETIES						
	Component Outcome: Improved varieties of foodcrops evaluated and released.	National network of Research Stations and smaller Research Posts established, sufficient to cover major crop types and agroecological zones. 10-15 new varieties of foodcrops evaluated and officially released. MAF research staff competently managing all phases of the research cycle, including objective setting, planning and implementation of trials, analysis, and reporting.	Field inspections. Annual workprograms and technical reports. Variety release committee minutes. Staff competency evaluations.	SOSEK Unit, assisted by the M&E Adviser and Research Adviser.	Annual.	Annual Progress Reports.
	Key Outputs:					
1.1	Establishment of Agricultural Research Centres and Stations completed.	**Research Centres** upgraded, nature of upgrade, location and cost. # professional staff deployed at Research Centres, by position and sex. Operational budget, by source. **# Research Stations** established, location and cost. # professional staff deployed, by position and sex. Operational budget, by source.	Program records. MAF staff records. SoL financial reports; MAF budget docs.	M&E Adviser, assisted by the Research Adviser.	6-mnthly.	6-mnthly Progress Reports & Mnthly Exception Reports.
1.2	Genetic material of potential improved varieties identified and sourced.	# and type of improved varieties introduced.	Program records.	M&E Adviser, assisted by the Research Adviser.	6-mnthly.	6-mnthly Progress Reports & Mnthly Exception Reports.
1.3	Potential new varieties evaluated on-station.	# varieties trialed on-station, by type and location. # trials completed and reported. # varieties selected for OFDTs. # Research Centre and Station deployed, by position and sex.	Annual technical research reports. MAF staff records.	M&E Adviser, assisted by the Research Adviser.	6-mnthly.	6-mnthly Progress Reports & Mnthly Exception Reports.
1.4	Potential new varieties evaluated on-farm.	# varieties trialed on-farm, by type and location. # OFDTs conducted, by type and location. # OFDTCs and OFDTOs deployed, by position and sex.	Annual technical research reports. MAF staff records.	M&E Adviser, assisted by the Research Adviser.	6-mnthly.	6-mnthly Progress Reports & Mnthly Exception Reports.
1.5	Selected new varieties officially released.	# new varieties officially released.	Variety Release Committee minutes.	M&E Adviser, assisted by the	6-mnthly.	6-mnthly Progress Reports & Mnthly

Appendix 6: Draft M&E Framework

	Intervention Logic	Draft Performance Indicators (PIs)	Means of Verification	Responsibility for data collection	Frequency/ deadline	Reporting mechanism
				Research Adviser.		Exception Reports.
1.6	Sufficient foundation seed being produced.	Qty of foundation seed produced, by type and location.	Research Centre records.	M&E Adviser, assisted by the Research Adviser.	6-mnthly.	6-mnthly Progress Reports & Mnthly Exception Reports.
1.7	Capacity of MAF research staff to manage the identification and release of new varieties strengthened.	# of people trained, by position, subject, type of training provided and sex.	Training reports and evaluations.	M&E Adviser, assisted by the Research Adviser.	6-mnthly.	6-mnthly Progress Reports & Mnthly Exception Reports.

	Intervention Logic	Draft Performance Indicators (PIs)	Means of Verification	Responsibility for data collection	Frequency/ deadline	Reporting mechanism
COMPONENT 2: FORMAL SEED PRODUCTION AND DISTRIBUTION						
	Component Outcome:. Sufficient high quality seed produced through formal channels to maintain the genetic quality of released varieties.	Four Seed Processing Centres established (2 new) for receiving, storing, grading, drying and packing formal seed, with a combined capacity of approximately 175 Mt per year. Production and distribution of 100 Mt of formal maize seed, 50 Mt of rice seed, 25 Mt of peanut seed, 600,000 sweet potato cuttings, and 600,000 cassava canes per year. Formal seed and planting material effectively and efficiently distributed to CSPGs and farmers. MAF seed production staff competently managing the production and processing of targeted quantities of formal seed; and extension staff competently managing the distribution of this seed to farmers.	Program records. Field inspections. SPC and nursery production/ distribution records. SOSEK Evaluation Report. Staff competency evaluations.	SOSEK Unit, assisted by the M&E Adviser and the Formal Seed Production Adviser (FSPA).	Annual.	Annual Progress Reports. SOSEK Evaluation Reports.
	Key Outputs:					
2.1	Formal seed produced through farmer contracts.	Qty of true seed produced, by variety and location. No. of farmers under contract, by variety and location. Value of seed produced. # and area of sweet potato and cassava nurseries established. # of sweet potato cuttings and cassava canes produced. # SPCs and SPOs deployed, by position and	MAF/ SPO production records. MAF staff records.	M&E Adviser, assisted by the FSPA.	6-mnthly.	6-mnthly Progress Reports & Mnthly Exception Reports.

	Intervention Logic	Draft Performance Indicators (PIs)	Means of Verification	Responsibility for data collection	Frequency/ deadline	Reporting mechanism
		sex.				
2.2	Quality assurance systems established.	% of formal seed produced that meets minimum standards, by type. % rejected.	SPC/ SPO production and purchase records.	M&E Adviser, assisted by the FSPA.	6-mnthly.	6-mnthly Progress Reports & Mnthly Exception Reports.
2.3	Technical extension support provided to contracted seed producers.	# extension staff providing direct support to contract seedgrowers. # of contract seedgrowers trained, by subject, type of training provided and sex.	Field assessment. Training reports and evaluations.	M&E Adviser, assisted by the FSPA.	6-mnthly.	6-mnthly Progress Reports & Mnthly Exception Reports.
2.4	Seed grading, packing and storage facilities established.	#, capacity and location of SPCs established. Total investment. # professional staff deployed, by position and sex. Qty of seed processed by SPCs, by variety.	Program records. MAF staff records. SPC purchase and processing records.	M&E Adviser, assisted by the FSPA.	6-mnthly.	6-mnthly Progress Reports & Mnthly Exception Reports.
2.5	Formal seed distributed through preferred distribution channels.	Qty of seed distributed by distribution channel, location and variety. # and type of field demonstration/ farmer training activities conducted by SEOs. Budget provided to local extension services for farmer training activities. $ generated from cost recovery on seed distributed.	MAF (national) and SPC distribution records. MAF records, field assessment. Program records. Program records.	M&E Adviser, assisted by the FSPA.	6-mnthly.	6-mnthly Progress Reports & Mnthly Exception Reports.
2.6	Capacity of MAF seed production and extension staff to manage the production and distribution of formal seed strengthened.	# of seed production staff trained, by position, subject, type of training provided and sex. # of extension staff trained, by position, subject, type of training provided and sex.	Training reports and evaluations.	M&E Adviser, assisted by the FSPA.	6-mnthly.	6-mnthly Progress Reports & Mnthly Exception Reports.

	Intervention Logic	Draft Performance Indicators (PIs)	Means of Verification	Responsibility for data collection	Frequency/ deadline	Reporting mechanism
COMPONENT 3: INFORMAL SEED PRODUCTION AND DISTRIBUTION						
	Component Outcome: Mechanisms for the production and distribution of seed through informal and market channels strengthened.	Around 1,000 CSPGs established and producing a marketable surplus of informal seed. CSPGs linked with market outlets and selling seed. Mechanisms for strengthening market-based exchange of informal seed trialed, evaluated, and where appropriate replicated.	Program and MAF extension records. Field evaluations. SOSEK Evaluation Reports. Program records. SOSEK Evaluation Reports.	SOSEK Unit, assisted by the M&E Adviser and the Informal Seed Production Adviser (ISPA).	Annual.	Annual Progress Reports. SOSEK Evaluation Reports.
	Key Outputs:					
3.1	Community Seed Production	# and location of CSPGs established, by crop	Program and MAF records and	M&E Adviser,	6-mnthly.	6-mnthly Progress

Appendix 6: Draft M&E Framework

	Intervention Logic	Draft Performance Indicators (PIs)	Means of Verification	Responsibility for data collection	Frequency/ deadline	Reporting mechanism
	Groups established.	type. Total membership, by sex. # women-only groups established. Total production of CSPGs, by variety. Qty and value of sales, by variety. # SEOs directly involved in supporting establishment of CSPGs	field evaluations.	assisted by the ISPA.		Reports & Mnthly Exception Reports.
3.2	Farmer Seed Marketing Groups established.	# and location of FSMGs established. Total no of CSPGs as members. Total production, by variety. Qty and value of sales, by variety.	Program records and field evaluations.	M&E Adviser, assisted by the ISPA.	6-mnthly.	6-mnthly Progress Reports & Mnthly Exception Reports.
3.3	Focal seed merchants in local markets established.	# focal seed merchants supported, by sex. Qty and value of sales, by variety.	Program records and field evaluations.	M&E Adviser, assisted by the ISPA.	6-mnthly.	6-mnthly Progress Reports & Mnthly Exception Reports.
3.4	Access to seed for vulnerable groups improved through seed fairs.	# of seed fairs conducted, by location. # of merchants involved, by type. # buyers involved. Qty and value of sales, by variety.	Program records and field evaluations.	M&E Adviser, assisted by the ISPA.	6-mnthly.	6-mnthly Progress Reports & Mnthly Exception Reports.
3.5	Systems linking informal seed producers with potential buyers developed.	# districts where system established. # of suppliers recorded. # buyers recorded. Qty and value of sales facilitated, by variety.	Program records and field evaluations.	M&E Adviser, assisted by the ISPA.	6-mnthly.	6-mnthly Progress Reports & Mnthly Exception Reports.
3.6	Capacity of MAF extension staff to establish CSPGs strengthened.	# of people trained, by position, subject, type of training provided and sex.	Training reports and evaluations.	M&E Adviser, assisted by the ISPA.	6-mnthly.	6-mnthly Progress Reports & Mnthly Exception Reports.

	Intervention Logic	Draft Performance Indicators (PIs)	Means of Verification	Responsibility for data collection	Frequency/ deadline	Reporting mechanism
COMPONENT 4: SEED SYSTEM MANAGEMENT						
	Component Outcome: MAF capacity to manage the national seed system strengthened.	National seed planning, allocation and inventory control systems established. M&E/ SOSEK unit competently managing the implementation of field evaluation activities, providing a sufficient basis for progressive learning. Policy issues identified and advice provided on key issues related to development of the national seed system.	Planning, allocation and inventory control systems in place and being used. Evidence of M&E/ SOSEK evaluations and utilisation of findings. Evidence of policy advice provided.	NPM plus SoL Team Leader NPM plus SoLTL NPM plus SoLTL	Annual.	Annual Progress Reports. SOSEK Evaluation Reports.

Appendix 6: Draft M&E Framework

	Intervention Logic	Draft Performance Indicators (PIs)	Means of Verification	Responsibility for data collection	Frequency/ deadline	Reporting mechanism
		Gender issues fully reflected in implementation of the national seed system.	SOSEK Evaluation Reports.	SOSEK Unit, assisted by the Gender Adviser		
		Widespread awareness of SoL varieties in all districts.	SOSEK Evaluation Reports.	SOSEK Unit, assisted by the M&E Adviser		
		Improved varieties and management practices being identified taking into consideration projected climate change impacts.	Annual research workprograms and technical reports.	Climate change Adviser plus Research Adviser.		
	Key Outputs:					
4.1	Seed planning & management systems established.	Forward planning systems developed and operational. Allocation procedures developed and operational. National inventory management system established and operational.	Seed production plans. Allocation procedures and distribution plans. Inventory control reports.	NPM plus SoLTL.	6-mnthly.	6-mnthly Progress Reports & Mnthly Exception Reports.
4.2	M&E / SOSEK processes strengthened.	# of dedicated staff involved in the M&E / SOSEK Unit. # and nature studies conducted and reported.	MAF staff records. Evaluation reports.	M&E Specialist plus M&E Adviser.	6-mnthly.	6-mnthly Progress Reports & Mnthly Exception Reports.
4.3	GoTL seed policy being informed by SoL experience.	# of seed system-related policy issues identified. # of advisory documents prepared and submitted.	Policy advisory notes.	NPM plus SoLTL.	6-mnthly.	6-mnthly Progress Reports & Mnthly Exception Reports.
4.4	Seed system gender strategy implemented.	To be defined by Gender Specialist.	To be defined by Gender Specialist.	Gender Specialist plus M&E Adviser.	6-mnthly.	6-mnthly Progress Reports & Mnthly Exception Reports.
4.5	Improved-variety technical & promotional materials developed.	# and type of technical and promotional materials prepared. Extent of distribution.	Technical and promotional materials. Production and distribution records.	NPM plus SoLTL.	6-mnthly.	6-mnthly Progress Reports & Mnthly Exception Reports.
4.6	Awareness of improved varieties increased though use of mass media.	# of mass media campaigns conducted, by channel and cost. Size of target audience.	Program records. Effectiveness evaluations.	NPM plus SoLTL.	6-mnthly.	6-mnthly Progress Reports & Mnthly Exception Reports.
4.7	Environmental and climate change impacts addressed.	# species/ varieties evaluated taking climate change considerations into account, by species/ variety. # released. # and nature of farming system adaptations recommended.	Annual research workprograms and technical reports.	Climate Change Adviser plus Research Adviser.	6-mnthly.	6-mnthly Progress Reports & Mnthly Exception Reports.
4.8	Capacity of MAF staff to manage the national seed system enhanced.	# of people trained, by position, subject, type of training provided and sex.	Training reports and evaluations.	M&E Adviser.	6-mnthly.	6-mnthly Progress Reports & Mnthly Exception Reports.

Appendix 6: Draft M&E Framework

	Intervention Logic	Draft Performance Indicators (PIs)	Means of Verification	Responsibility for data collection	Frequency/ deadline	Reporting mechanism
PROGRAM MANAGEMENT						
	Objective: SoL III effectively and efficiently managed in a manner that is responsive to stakeholder needs.		Independent Mid-Term Review.	MTR	Scheduled for early 2013.	MTR Report to PSC, AUsAID and ACIAR.
	Key Outputs:					
5.1	Program governance arrangements established and operating effectively.	PSC established and meeting routinely. APs and M&E reports reviewed and endorsed by PSC.	PSC minutes. PSC minutes.	NPM plus SoLTL	Annual	Annual Progress Reports.
5.2	Program Management Unit established and operating effectively.	PMU established and core GoTL staff appointed including the NPM. Regional Offices established; Regional Coordinators appointed. # GoTL staff appointed, by position and sex. # LT TA staff appointed, by position and sex. # and type of training conducted for PMU/ RO staff. Staff performing to a satisfactory level. Physical and financial management systems established. Communication Strategy and Administrative Guidelines developed/ refined. APs prepared in timely manner and approved by AusAID/ ACIAR. APs implemented in an efficient manner. Progress reports prepared in a timely manner. M&E Framework established and effectively implemented. Timely mobilisation of high quality ST TA. # TAG visits conducted.	Staffing records and duty statements. Training reports. Annual staff performance evaluations. 6-mnth Progress and Financial Reports. Communications Strategy and Admin Guidelines. APs. 6-mnthly Progress Reports. MEF design and M&E Reports. TA mobilisation records. TAG Reports.	Program Director, UWA Coordinator, SoLTL plus NPM.		6-mnthly Progress Reports & Mnthly Exception Reports.
5.3	Program effectively coordinated with other relevant donor programs.	# of other donor programs with which SoL III is formally associated. Nature of cooperation.	6-mnth Progress Reports.	Program Director, UWA Coordinator, SoLTL plus NPM.		6-mnthly Progress Reports & Mnthly Exception Reports.
5.4	Lessons learned systematically reviewed and shared with Government and other donors.	# lessons learned/ sharing workshops conducted; # of participants.	6-mnth Progress Reports. Lessons-learned reports.	Program Director, UWA Coordinator, SoLTL plus NPM.		6-mnthly Progress Reports & Mnthly Exception Reports.
5.5	Pilots on the direct use of MAF's financial systems implemented, evaluated and reported.	% of *Chef de Suco's* reporting satisfactory service delivery. Satisfactory audit report.	SOSEK Evaluation Reports. Audit reports.	SOSEK Unit plus M&E Adviser. Auditors.	Annual	Separate Reports.

DRAFT TOR FOR THE M&E SPECIALIST

1. Qualifications

The consultant should hold a post graduate degree that has included a research dissertation component. Alternatively, evidence of training in *advanced* research or evaluation design, conduct and management. Short professional development courses in M&E are not considered advanced training.

Where a post graduate degree in research or evaluation methods has not been completed, evidence of the quality of research or evaluation activities previously designed and conducted should be sought.

2. Experience

Essential

2.1 Experience developing M&E systems for projects in resource constrained settings. This is required to ensure that the proposed M&E systems are feasible in the context.

2.2 Demonstrated practical experience in research or evaluation design, conduct, and management. This experience should reflect expertise in developing a fully elaborated design of an M&E system which includes the design approach, articulation of M&E questions, development of sound methods and tools, conduct of data collection activities, analysis of data (or supervision of such), interpretation and dissemination of results and report preparation.

2.3 Demonstrated ability to breakdown and communicate complex concepts simply with a range of stakeholders in multi-cultural settings.

2.4 Demonstrated ability to develop and deliver M&E capacity building activities for implementation teams. This may include national partners.

2.5 Demonstrated ability to facilitate learning from M&E findings with implementation teams and other relevant stakeholders.

Desirable

2.6 Demonstrated experience in the delivery of development projects. This is required to ensure that the consultant is sensitive to the difficulties of implementing development projects in complex settings, that the design is feasible and value for money, and that the M&E systems meet the needs of all relevant stakeholders.

2.7 Demonstrated on-going membership of a domestic or international evaluation society, or other demonstrated commitment to keeping up to date with the theoretical and practice developments in the field of evaluation.

3. Terms of Reference

3.1 Conduct an Evaluability Assessment at a time when the implementation team and partners are ready and able to clearly articulate the outcomes of the initiatives. The M&E Specialist is expected to be familiar with this form of assessment.

3.2 Using a participatory approach, finalise the monitoring and evaluation framework that meets the expectation of AusAID and international standards of practice in M&E. AusAID standards are available from Program Managers, while international standards could include the DAC Evaluation Quality Standards, or the Joint Committee Standards.

3.3 Identify where the implementation team will require on-going M&E technical support, and where they will be expected to implement the M&E framework themselves.

3.4 Identify what capacity is required by the implementation team (and specifically the LT M&E Adviser and the SOSEK Unit) to implement the M&E Framework. Develop a simple capacity building plan to

develop relevant skills, and to ensure that there is an enabling environment in place to implement the M&E Framework.

3.5 Provide regular on-going support to the M&E Adviser and the SOSEK Unit for the implementation of the M&E Framework. The focus ought to be on the on-going design of M&E activities; assuring the quality of the M&E system implementation; providing technical support for the analysis and interpretation of data; and providing training support for the SOSEK Unit.

3.6 Supervise the compilation of progress reports that meet the requirements of AusAID. An evidence-based, timely contribution to the Quality at Implementation Reports and Activity Completion Reports should be prepared. Negotiation of suitable content and presentation of reports should be part of the Evaluability Assessment outlined above. Reports must reflect an analytical contribution where the implications of findings are explored, not simply reported

3.7 Prepare relevant outcome and output data in advance of any review team missions.

3.8 Contribute to the intellectual development of the initiative during implementation. Working as a facilitator, support the implementation team and other relevant stakeholders to interpret and respond to M&E findings over the life of the initiative.

3.9 In consultation with AusAID and ACIAR, develop the methodology for the collection and analysis of data for assessing the quality of implementation processes. Provide support to the TAG in application of this methodology.

GUIDANCE FROM AUSAID REGARDING FINALISATION OF THE M&E FRAMEWORK

AusAID has provided the following guidance concerning areas where the draft MEF could be further improved. This should be taken into account by the M&E Specialist when the MEF is reviewed during program start-up.

***Goal/Impact measures*:** the M&E framework should include broader food security measures to monitor key trends that affect the impact of SoL III investments (e.g. post harvest handling). The conceptual point of a 'goal-level' indicator is that it is beyond the scope/attribution of the project (unlike EOPOs) and provides a sector view on how the project contributes to the broader GoTL agenda (i.e. food security). Monitoring trends in food security provides three advantages: firstly, it enables the project and AusAID managers to appreciate, leverage and report other contextual factors that impact on SoL III investments. For example, at the peer review the example was given that effective post-harvest handling could directly increase the productivity of seed production. Secondly, it strengthens the project's ability to demonstrate a 'contribution analysis' between SoL III outcomes and broader improvements in food security. Thirdly, it provides possible opportunities to use and strengthen GoTL M&E systems which are focused on capturing information at this level. This approach does not compromise the MEF, of which 90% + is devoted to managing and monitoring the project itself. And it directly supports the emphasis of point 1.

Performance measures: draft indicators as are descriptive and volume-based – e.g. # of varieties trialled on-station, by type and location. It is recognised that baseline information will be collected but equally important is the setting of targets to provide context and benchmarks to assess adequate progress each year. The need to have a baseline and a target in order to measure progress applies equally to outputs and outcomes. Also, without targets it is unclear what measuring the type/number of outputs will tell us? For example, what is a sufficient number of varieties trialled? It isn't clear how collecting this information will impact on decision-making or reporting

Capacity measures: the draft indicators will not capture key changes – e.g. 'Capacity of MAF research staff to manage the identification and release of new varieties strengthened' is measured by # of people trained, by position, subject, type of training provided and sex. Progress measurement examples in Appendix 2 Table 4 should be integrated into the M&E framework.

APPENDIX 7

RISK MANAGEMENT MATRIX

Appendix 7: Risk Management Matrix

Risk Class	Risk	Likelihood	Consequence	Rating (1-5)	Mitigation Measures
Management	Unrealistic expectations by MAF regarding their control of financial and physical Program resources.	High	High	5	Continued dialogue by AusAID with MAF prior to Phase III mobilization. Developing a meaningful role for MAF in *influencing* the allocation of resources through specified planning and implementation management procedures.
	Management fails to adapt to a much broader Program.	Med	High	4	Close supervision by AusAID and ACIAR over the first 2 years. Appointment of a dedicated Team Leader position with substantial experience managing broad-based activities.
	Lack of sufficient coordination across the 3 key MAF Directorates.	Med	High	4	Establish an overarching PMU. Appoint a National Program Manager at a position above MAF's technical Directors.
	Compartmentalization of activities within Directorates prevents the degree of coordination necessary for effective implementation of a national seed system.	Med	Med	3	Appoint a National Program Manager to coordinate activities across divisions. Provision of a LT TA position for each component and directorate, providing a *de facto* coordination mechanism from within the TA Team.
	MAF fails to appoint a full-time National Program Manager at a sufficiently senior level.	Med	High	4	Bring issue to attention of donors and PSC. Defer disbursement until an appointment is made.
	MAF fails to appoint sufficient additional staff required for national scale-up.	Med	High		Bring issue to attention of donors and PSC. Be prepared to pay for some staff from Australian budget.
	Lack of Yr 1 & 2 budget adversely affects ability to scale-up as planned, reducing projected adoption.	Med	Med	3	Bring issue to attention of donors. Seek additional funding from GoTL. Delay start-up of some PY1 & 2 activities, and accept reduced coverage rates.
	Inability to attract and retain suitable LT TA (qualifications, experience, approach and motivation).	Low	High	3	Define recruitment and selection criteria prior to end of SoL II. Allocate significant time and resources to the selection process.
	Difficulty of managing and ensuring the integrity of a geographically distributed team hinders effective management.	Low	Med	2	Establish Regional Offices. Ensure appropriate internal communication protocols; adequately resource communication equipment.

Appendix 7: Risk Management Matrix

Risk Class	Risk	Likelihood	Consequence	Rating (1-5)	Mitigation Measures
Intervention	Suitable new varieties with clear yield advantages are increasingly difficult to identify.	Low	Med	2	Progressively shift R&D emphasis onto identifying improved farming systems when this occurs.
	MAF aspirations to increase the production of formal seed beyond rational limits undermines development of a national seed industry.	Med	High	4	Seek to develop planning and management capacity through C4. Seek to influence policy through C4. Only finance formal seed production up to specified limits.
	Reliance on too few production seed locations leads to high annual variation in production of formal seed.	Low	Med	2	Maintain some geographical spread. Careful selection of production areas. Careful selection of contract growers with appropriate resources.
	Failure to develop a constructive working relationship with district administrations adversely impacts on more rational distribution of formal seed, and development of informal seed production mechanisms.	Low	Med	2	Work through national MAF Directorates to help establish effective working relationships with District Offices. Establish Regional Offices. Actively involve district MAF Offices in the planning and implementation of activities.
	MAF *Suco* Extension Officers have insufficient capacity to perform as required in formal seed distribution and informal seed production activities.	Med	Med	3	Provide training and operational budget to support these activities. Link with capacity development efforts of RDP IV and other bilateral projects
	Benefits of formal seed are not maximised due to use of inappropriate distribution channels.	Med	Med	3	Give CSPGs priority access to formal seed. Establish rules of engagement for any third parties (eg NGOs) that receive this seed. Develop awareness of MAF re: the value of this seed and of the need to ensure its appropriate use. Place emphasis on improving planning/ distribution capacity of MAF through C4.
	Physical distribution of formal seed is poorly planned and managed.	Med	Med	3	Develop a more mainstream role for local extension staff in this activity, appropriately resourced. Place emphasis on improving planning/ distribution capacity of MAF through C4. Engage closely with district administrations.
	MAF policies on procurement and distribution of relief seed undermine efforts to develop a national seed industry.	Med	Med	3	Provide clear policy advice through C4, especially seed purchasing and distribution. Seek to influence how donors operate.

Appendix 7: Risk Management Matrix

Risk Class	Risk	Likelihood	Consequence	Rating (1-5)	Mitigation Measures
	MAF proves unable or unwilling to support informal sector development activities.	2	3	2	Actively 'sell' the merits and need for informal sector involvement to MAF. Be prepared to use alternative channels of support e.g. NGOs and bilateral programs.
	Farmers risk aversion prevents uptake of improved varieties as projected.	2	4	2	Final selection and exposure of potential new varieties to communities through OFDTs. Provide SEOs with operating resources to conduct demplots and farmer training activities.
	Markets for seed in TL are too weak for market-based exchange mechanisms to be developed.	3	2	2	Undertake proposed activities as pilots and only scale-up if results are acceptable. Adopt a realistically long-term view for development of market mechanisms.
	CSPGs are not sustainable due to poor demand for informal seed.	2	4	3	Develop FSMGs and strengthen links between producers and markets. Seek to stimulate demand through mass media. Provide groups with preferential access to formal seed of need varieties. Develop mechanisms for possible govt purchase of surplus CSPG seed (rather than importing seed).
	Informal seed producers have insufficient incentives to manage the quality of seed to an acceptable level.	3	3	3	Provide on-going training support. Provide seed storage containers. Accept that quality will be lower and will decay over time. Provide regular injections of formal seed.
	Politicisation of variety names adversely affects adoption.	3	2	2	Seek to influence naming rights and choice of names.
	Informal seed production and distribution initiatives are hijacked by Co-operative policies and agendas.	2	4	2	Develop appropriate institutional settings. Emphasise PS engagement. Mobilise strongly PS-oriented TA.
	Gender issues are marginalized, specifically developing equitable access for women to improved varieties and other Program benefits.	2	4	3	Finalise a comprehensive Gender Strategy during Inception. Actively monitor gender issues and impacts. Provide specialist TA to drive the gender agenda.

Appendix 7: Risk Management Matrix

Risk Class	Risk	Likelihood	Consequence	Rating (1-5)	Mitigation Measures
Development	External risks (natural disasters, tensions, economic factors)	Low	Med	2	Security and evacuation procedures in place.
	Provision of free handouts increasingly mitigates against development of a market economy.	Med	Med	3	Seek to influence policy through broader donor engagement.
	Donor distribution of free seed undermines efforts to establish development of a national seed industry.	Med	Med	3	Actively work to expose donors to what SoL is trying to achieve. Develop mechanisms for donors to buy surplus SoL informal seed. Develop capacity of national and district MAF to influence how donors operate in relation to seed distribution.
	Climate change adversely affects crop production.	3	2	2	Actively monitor impact of climate change on agricultural production. Identify climate-change adapted varieties through C1. Emphasize SoL as a mechanism for actively managing climate change.
	Introduction of new varieties results in negative environmental impacts.	Low	Low	1	On-going review of possible environmental impact associated with the introduction of new varieties by ST Environmental Specialist.

APPENDIX 8

FINANCIAL AND ECONOMIC ANALYSIS

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EXECUTIVE SUMMARY

Overview. Distribution of SoL's improved varieties will substantially increase foodcrop production in Timor-Leste, assuming that farmers plant 50% of their land which was previously planted to traditional varieties, to new varieties (see table below). These new varieties have the potential (even after a 30% downward adjustment in predicted increases in yields to reflect a conservative approach to the financial and economic analyses)[50] to increase household food production by about: (i) an additional 150 kg of rice; (ii) 180 kg of maize; (iii) 50 kg of peanuts; (iv) 20 kg of sweet potato; and (v) 0.7 Mt of cassava.

Placing a financial value on increased food production shows that if adopting families chose to sell their additional production they will earn increased in crop gross margins - around 50% or more for non-rice crops, and 40% for rice crops. Incremental annual cash incomes per household vary from $16 for sweet potato to $119 for cassava. These increases are directly attributable to SoL's varieties because, apart from limited increases in labour requirements (because of increased crop production) all other costs remain constant.

SoL III also the potential to impact very positively on Timor-Leste's rural economy which employs and feeds the majority of the nation's population. It is estimated that the Program's EIRR will be 26% and the Benefit/Cost Ratio (at 15%) will be 1.6. These are robust figures and confirm that investment in adaptive foodcrop research followed by the development of a national seed industry has the potential to generate high returns to GoTL's and donors' funds, and ensure that the poorer rural populations receive an equitable share of the nation's petro dollars.

SoL's improved foodcrop varieties will also contribute substantially to Timor-Leste's national objective of food self-sufficiency. By Year 10 it is expected that SoL's varieties will be responsible for the production of an additional 88,000 Mt of food per year, which is slightly less than the total tonnage of staple food[51] imported in 2009. Furthermore, the bulk of the additional food produced using SoL's new varieties will be upland crops (maize, peanuts, cassava and sweet potato) which are staples for the poorer sectors of Timor-Leste's rural community.

SoL's total incremental costs (for all three phases) are estimated to be $71.32 million over 20 years. The use of SoL's varieties should result in total incremental food production (over the same period) of 1.58 million Mt. This equates to an incremental cost per Mt of food of about $45, considerably less than the cost of imported food ($400/Mt CIF).

SoL III is expected to have widespread and significant social impact in the form of: (i) increased supplies of staple foods in areas that currently suffer from prolonged periods of *hunger* and *malnutrition*, with associated negative *health* effects; (ii) *equity benefits* for non-rice producing communities; (iii) *political benefits* in the form of enhanced peace and stability; and (iv) *gender benefits* derived from efforts to ensure that women, and particularly women-headed households, receive equitable access to improved varieties and technical information, direct support for groups of women farmers, and recognition of the distinct roles played by women and men in the various agricultural production calendars.

[50] The incremental production and farm income figures reported in Tables 5 – 9 have been reduced by 30%.
[51] Grain for human consumption, mainly rice (about 110,000 Mt in 2009).

Irrigated Rice	WOP a/	WPb/	Increase	% increase
Cropped area (ha/hh) (50%)---->c/	0.35	0.35	0.00	
Yields (Mt/ha)---->d/	2.50	3.13	0.63	25%
Food production (Mt)---->e/ f/	0.616	0.763	0.147	24%
Gross Margin ($/hh)---->g/	$116	$160	$43	37%
Upland Maize				
Cropped area (ha/hh) (50%)---->	0.35	0.35	0.00	
Yields (Mt/ha)---->	1.44	2.16	0.72	50%
Food production (Mt)---->	0.350	0.532	0.182	52%
Gross Margin ($/hh)---->	$102	$163	$61	59%
Peanut				
Cropped area (ha/hh) (50%)---->	0.15	0.15	0.00	
Yields (Mt/ha)---->	1.50	2.00	0.50	33%
Food production (Mt)---->	0.161	0.210	0.049	30%
Gross Margin ($/hh)---->	$71	$104	$33	47%
Sweet Potato				
Cropped area (ha/hh) (50%)---->	0.025	0.025	0.00	
Yields (Mt/ha)---->	3.10	4.40	1.30	42%
Food production (Mt)---->	0.056	0.077	0.021	38%
Gross Margin ($/hh)---->	$33	$49	$16	49%
Cassava				
Cropped area (ha/hh) (50%)---->	0.10	0.10	0.00	
Yields (Mt/ha)---->	19.00	29.00	10.00	53%
Food production (Mt)---->	1.330	2.030	0.700	53%
Gross Margin ($/hh)---->	$202	$321	$119	59%

a/ WOP = Without Program.

b/ WP = With Program.

c/ Assumes that target hhs only plant 50% of their land to SoL varieties.

d/ Increased food/cash crop production/ha

e/ From areas of different crops planted to SoL varieties

e/ Minor errors due to rounding, **and yields reduced by 30% for conservative estimate.**

g/ Value of increased food/cash crop production grown on areas planted to SoL Varieties.

SoL III will support the emergence of private sector *formal* seed growers, and the establishment and operation of community seed production groups (CSPGs), and follow-on farmer seed marketing groups (FSMGs) which are expected to supply *informal* seed to the slowly-emerging market for good quality foodcrop seed. By Year 4 it is expected that SoL III will be producing 50 Mt of rice seed, 100 Mt of maize, and 25 Mt of peanut, and therefore it is expected that the Program will support about 175 contract seed growers. In addition, by the end of Year 5 it is expected that MAF's *Suco* Extension Officers (SEOs) will have formed and supported about 1,000 CSPGs.

SoL III is unlikely to impact negatively on Timor-Leste's rural environment. The impact on food production will be achieved through the relatively 'simple' intervention of introducing improved varieties of existing foodcrops. A number of positive environmental impacts are possible through the development of improved farming practices. And, through its ongoing applied and adaptive research efforts, the Program is expected to achieve a range of scientific impacts in relation to the identification of improved varieties and improved farming systems.

End-of-Program Household Impact Outcomes. It is not possible to state an end-of-Program household impact outcome in the form of a single number of farming households using SoL's improved varieties because Timor-Leste's rural sector is characterized by two distinct farming systems based on two main cereal crops – rice and maize. In addition, Timor-Leste's farmers grow a wide range of food and cash crops with the objective of reducing the risk of hunger following crop failure.

Therefore the expected household impact end-of-Program outcomes have been expressed as the percentage and numbers of rice farmers, and the percentage and numbers of maize farmers, expected to be impacted on (using SoL's improved varieties) by the end of Year 5. Targets are therefore about 68,000 rice and 138,200 maize growing households, with SoL III expected to impact on 68% of rice growing households (46,000) and 44% of maize growing households (60,600)[52].

[52] After capping the maximum percentage of impacted households, on a crop-by-crop basis, to 70% of the total households growing the individual crops – see Tables 2 and 3.

1. Introduction

1.1. Terms of Reference

This appendix is based on the financial and economic analyses completed as part of the design exercise for SoL III. The overall terms of reference for the design mission are detailed in Appendix 11. The specific terms of reference for the financial and economic analyses were extracted from Appendix 11 and can be summarized as:

- Undertake an analysis of the likely economic impact of SoL III on East Timor, drawing on the preliminary cost-benefit analysis undertaken by Geoff Moyle.
- Assess the likely impacts of the SoL Program on collaborating households, and especially on women, of increased yields, improved food availability, expanded engagement in markets, and changing approaches to food storage.

Note: food storage was not included in the final design because of budget limitations[53], and the decision that SoL III should focus on improved foodcrop varieties and not 'diversify' into grain storage.

1.2. Appendix Format

The appendix first outlines the methodology used to complete the financial and economic analyses. This covers the identification of target households on a crop-by-crop basis, and an estimate of the rate at which target households will be phased into the Program, the latter determined by the supplies of improved varieties of seed and planting materials. This is followed by an estimation of the rate at which target households might adopt (and continue to use) SoL's improved varieties.

The analysis then considers end-of-Program household impact outcomes which are specified in terms of the numbers of households impacted by SoL III by Year 5, and incremental household food production or incomes, depending on whether the additional crop production is sold or consumed. These estimates were determined by preparing static crop-specific household production and financial models, based on incremental crop yields reported by SoL II.

The household models were then adjusted for economic prices and the opportunity cost of incremental labour, and scaled up to estimate the Programs EIRR and B/C ratio, Finally, the scaled-up model was used to estimate total incremental food production over a 20-year period, and the incremental cost per incremental tonne of food grown as a result of farmer adoption of SoL's varieties.

2. Financial and Economic Analyses

2.1. Target Households

Phase III of SoL will be a national Program and therefore it will be necessary to target all farming households in Timor-Leste. Table 1 gives an indication of the potential size of Phase III in terms

[53] This aspect of rural development in Timor-Leste will require investment in excess of US$20 million to significanTimor-Lestey reduce food losses (mainly grains and particularly maize).

of the current number of households growing Timor-Leste's major foodcrops. The data used to derive Table 1 came from the last reliable national household census in 2004, and have been inflated to estimate the current number of farming households.

Table 1: Target Households

District	Tot hh a/	Rice	Maize	Cassava	S. Potato	Peanut
Aileu	7,745	1,847	7,042	6,983		
Ainaro	11,527	1,531	10,686	9,284		
Baucau	22,659	12,967	15,360	13,721		
Bobonaro	18,397	7,166	14,459	13,093		
Covalima	11,820	3,980	9,891	9,877		
Dili	31,575	658	6,866	7,813		
Ermera	21,165	3,641	18,766	18,638		
Lautem	12,998	5,526	10,854	9,921		
Liquica	11,063	607	9,500	9,236		
Manatuto	8,338	4,507	5,158	5,100		
Manufahi	8,901	2,415	7,617	7,873		
Oecusse	13,659	4,378	2,694	9,662		
Viqueque	15,115	11,743	12,623	13,032		
Timor Leste (total)	**194,962**	**60,966**	**131,516**	**134,233**	**na**	**na**
Rural households b/	147,048	54,277	112,185	113,778		
Adj for 2010 no of hh c/	166,047	61,290	126,679	165,007	80,000	10,000
HH targeted for SoL impact analysis		62,300	126,700	165,000	82,500	10,000
Area of crops (2009) d/		40,000	80,000	na	na	na
Area crops (ha/hh) e/		**0.74**	**0.71**	**0.21**	**0.11**	**0.29**

a/ Source: 2004 national census data.
b/ Total hh, less Dili hh x 0.9 (adj for other non-rural hh) (2004); total and hhs growing crop.
c/ No of hh in 2004 inflated by 1.5% per annum to end of 2010.
d/ Estimated crop areas. Note: agricultural statistics are very unreliable in TL.
e/ Cassava - 30% of maize area; sweet potato - 15% of maize area - SoL estimates.
Table source: World Bank; APIP Concept Paper, 2009, adjusted.

The key information in Table 1 is that by the end of 2010 it is expected that Timor-Leste will have about 166,000 farming households of which about 61,300 grow irrigated rice, 126,700 upland maize, 165,000 cassava, and (by deduction[54]) 82,500 sweet potato. There is no information on the number of households growing peanuts but a dated report by ACIAR[55] indicates that the number could be about 10,000. The other information in Table 1 which is directly to SoL III is the areas (ha) of the main foodcrops and the average areas planted per household. For example in 2009 there were about 40,000 ha of irrigated maize and 80,000 ha of maize in Timor-Leste. However when these areas are related to the number of households growing the different crops the calculated average areas (0.74 ha for irrigated rice and 0.71 ha for upland maize) are lower than the figures reported by MAF and its supporting Development Partners (DPs), generally about 1.0 ha of irrigated rice and 0.8 ha of upland maize. These discrepancies between reported and calculated figures for crop areas (and reported yields) cause major problems with agricultural development planning in Timor-Leste, hence the importance of following the national population census in 2010 with an agricultural census in 2011[56].

[54] About 50% of cassava growers also grow sweet potato.
[55] Nigam, S.N., Palmer, B., San Valentin, G., Kapukha, P., Piggin, C., and Monaghan, B. 2003. Groundnut: ICRISAT and East Timor, pp. 90-94, *In* H. da Costa, C. Piggin, C.J. da Cruz and J.J. Fox, (eds.) Agriculture: New Directions for a New Nation - East Timor (Timor Leste). ACIAR Proceedings No. 113.
[56] FAO has prepared an Agricultural Census Survey Project and is now seeking donors to fund the exercise.

Against this background of uncertainty, and for the purposes of estimating SoL III's impact on individual farmers and Timor-Leste as a whole, the design mission decided to base the financial and economic analyses, and the seed requirement projections, on the number of farming households listed in Table 1 and the following crop areas per household: (i) irrigated rice and upland maize – 0.70 ha with 50% of this area (0.35 ha) being planted to improved varieties[57]; (ii) 0.2 ha of cassava (0.1 ha planted); (iii) 0.1 ha of sweet potato (0.05 ha planted); and (iv) 0.3 ha of peanuts (0.15 ha planted).

2.2. Household Phasing

The phasing of target foodcrop growing households into SoL III was determined by calculating the number of households which could be supplied with improved quality seed and planting materials on an annual basis, for each of the five main crops referred to in Section 2.1. An example of these calculations for rice is given in Table 2[58], and an explanation in the form of a list of assumptions and calculations is given below in dot-point format.

- Firstly the number of households requiring replacement seed is calculated, e.g. in Year 5 3,150 households who received seed in Year 1 need fresh seed (row 26), as do 3,115 households who received rice seed in Phase II (row 35).
- Then an assumption is made in terms of the realistic amount of seed which SoL III should be able to produce on a long-term basis – for rice this was set at 25 Mt in Year 1 and 50 Mt in Year 2 onwards (row 41)
- Assuming that 10% of the 25 Mt would need to be retained for emergencies (row 40) this leaves a balance of seed available for distribution to Phase III target farmers, e.g. in Year 5 this is 13.675 Mt (row 43)
- This "surplus" seed is then progressively distributed to target households (rows 1 – 20) on the basis that each household receives 5 kg of seed and 70% of households multiply and retain sufficient seed to be considered as adopters in the year after the initial distribution. In addition it is assumed that these adopters, in turn, pass on seed to two family and friends' households, 70% of which become adopters one year after receiving seed from a friend or relative. For example, in Year 2, 45.00 Mt of seed is available for "new" distribution (row 3): 45,000/5*0.7 = 6,300 primary adopters in Year 3 and 8,820 secondary adopters in Year 4.
- Row 21 sums the total number of new adopters in Phase III, e.g. 36,686 households in Year 5, plus in addition, those households consider to be adopters from Phase II (15% of total target households = 9,345 households). Total adopters by end Year 5 (row 23) = 46,031.
- By the end of Year 5 it is estimated that there will be 46,031 adopter households, which represents about 70% of the total target households.
- In terms of replacement seed for adopters, it has been assumed that this will be provided five years after the first 5 kg distribution, e.g. the 3,150 households who received seed in Year 1 will receive fresh seed (possibly of a new variety) in Year 5 (row 26). Similarly the Phase II adopters will also need allocations of fresh seed and this is assumed to commence in Year 3 (row 35).

[57] Timor-Leste's farmers are extremely risk averse and therefore SoL does not intend to target 100% coverage (in terms of the percentage of farm areas planted to new species) by improved foodcrop varieties. This means that the wide range of local and traditional foodcrop varieties will remain important in terms of spreading farmers' production risks.

[58] Similar detailed seed phasing tables were prepared for maize, peanuts, sweet potato and cassava and are attached as an annex to this appendix.

2.3. Household Adoption Rates

Note: the maximum percentage of adopting households for any one foodcrop was capped at 70% to reflect a conservative approach to estimating production, financial and economic benefits.

Table 3 summarizes the detailed household phasing calculations for the five major foodcrops, and shows that:

- By the end of Year 5 a 'maximum' 70% of irrigated rice growers should be using improved varieties on 50% of their cropped area. Note that and some farmers are expected to adopt improved varieties across all of their land in recognition that it is possible to increase rice yields by about 25% by simply changing over to the Nakroma variety.
- Progress in terms of the percentage of upland maize growers adopting improved varieties is expected to be slower than the rate of improved rice variety adoption, mainly because of the relative difficulty for SoL III to increase annual maize seed production from 25 Mt to 100 Mt over the first four years of SoL III, whereas rice seed production only has to increase from 25 Mt to 50 Mt. SoL II's performance in terms of seed production was far better for rice than for maize, hence the suggestion by the design team that maize seed production sites might be more productive if located in areas with at least some supplementary irrigation[59].
- SoL III should be able to supply sufficient peanut seed by Year 3 for all target households to be supplied (pegged at 70%) because fewer families grow peanuts (due mainly to soil constraints). SoL II currently produces about 20 Mt of peanut seed per year so it should not be too difficult to increase annual seed production up to 25 Mt.
- It is expected that the adoption of sweet potato (and cassava – see next dot point) will be constrained by a lack of vegetative planting material. Although 600,000 cuttings can be produced from about 30 small (0.05 ha) gardens (the target), the distribution of cuttings is difficult and inefficient because of transport and perishability issues. Therefore it is estimated that only about 50% of target households will have adopted new sweet potato varieties by Year 5.
- If 600,000 canes of improved cassava varieties are produced from the targeted 15 x 1.0 ha plots it is estimated that about 20% of the targeted cassava households will be adopters by Year 5. This low figures is due to two factors: (i) commencing from a low starting point – it is estimated that only 5% of cassava-growing households received a new cassava variety during Phase II, mainly because the first officially-released variety is just being bulked-up (SoL has not been as successful in terms of identifying new cassava varieties compared with the other major foodcrops); and (ii) the difficulty of distributing canes because of transport and perishability issues[60].

[59] At present SoL II's contract maize growers are only producing about 1.0 Mt (purchased seed)/ha. This is a very low yield by any international standards. The target should be about 2.5 Mt (seed)/ha and this should be achievable with the use of supplementary irrigation.

[60] Note: cassava canes are not as delicate as sweet potato cuttings but are expensive to produce ($5,000 for 1.0 ha plot) and therefore SoL III will only establish 15 x 1.0 ha plots for bulking-up cassava canes.

2.3.1. Baseline adoption rates

For analytical purpose it was necessary to estimate farmer adoption rates by the end of SoL II. These were set at: (i) rice, and sweet potato (15% of households growing the crop); (ii) maize and peanut (10%); and (iii) and cassava (5%), based on information from various SoL reports, SOSEK reports and studies, and earlier impact assessment studies[61].

2.4. End-of-Program Household Impact Outcomes

Ideally it would be logical to state an end-of-Program household impact outcome in the form of a single number of farming households using SoL's improved varieties. However this is not possible for SoL III because Timor-Leste's rural sector is characterized by two distinct farming systems based on two main cereal crops – rice and maize, and Timor-Leste's farmers grow a wide range of food and cash crops with the objective of reducing the risk of hunger following crop failure. In summary, rice growers are also major maize and cassava growers, but very few maize growers grow rice. Therefore it is impossible to estimate a single number of impacted households be the end of the Program

Accordingly the design team decided to express the household impact end-of-Program outcomes as the percentage and numbers of rice farmers, and the percentage and numbers of maize farmers expected to be impacted on (using SoL's improved varieties) by the end of Year 5. By this time there will be about 68,000 rice and 138,200 maize growing households in Timor-Leste[62] and SoL III is expected to have impacted on 68% of rice growing households (46,000) and 44% of maize growing households (60,600) – see Table 3 for a more detailed breakdown on the numbers of households expected to be impacted on by SoL III by Year 5 on a crop-by-crop basis.

2.5. Impact on Women Farmers and Women-headed Households

About 20% of rural households are headed by women (WHHs) in Timor-Leste and women have an integral role in the country's subsistence farming systems. Therefore it is very important that family adoption of SoL's improved foodcrop varieties does not impact negatively on women farmers, and that the incremental benefits from SoL III are equitable shared between women, men and children. SoL II addressed this potential issue by always including women's farming groups and WHHs in the Program's variety selection processes, e.g. attendance at field days and participation in OFDTs (including food preparation, food tasting and storage tests). This approach will continue in Phase III and it is expected that SoL's gender dis-aggregated farming practices calendar (which has been translated into Tetum) will be used throughout the country to assist MAF staff at various levels understand the roles of female farmers.

In terms of specific SoL III impacts in women farmers and their families, the Program is expected to generate considerable increases in food production (see Section 2.8.1) which will benefit all household members. Importantly, this additional food will be grown without any increase in cash costs - the only activity required to achieve benefits from SoL's improved foodcrop varieties is to replace the seed (and planting materials) of existing varieties. Careful assessment of the crop-

[61] Note: SoL II's seed distribution system (through numerous development partners, NGOs, etc.) meant that it was very difficult to keep track of household adoption rates. A SoL II report entitled Timor-Leste: "Three years after OFDTs – farmer adoption rates, dissemination and reasons for dis-adoption" contains useful information on initial adoption rates and on-going use of improve varieties.

[62] 2004 Household National Census figures inflated by 1.75% to reflect an increase in the number of farming households over time.

specific production and financial models (Section 2.6) revealed that there will be minimal additional family labour required to grow and harvest SoL's improved varieties. For example, growing Nakroma rice will require an additional four person days of labour per year and this input is expected to generate an additional 150 kg of rice valued at $62 (incremental gross margin). Similarly, use of SoL's improved maize variety is expected to require an additional nine labour days per family per year in order to produce an additional 180 kg of food valued at $87 (incremental gross margin).

Table 2: Example of Household Phasing for Rice

Phasing of rice households - rice seed production 25 Mt in year 1 and 50 Mt per year thereafter														
Row No.	Ph III new seed dist'n (kg)	Year-->	1	2	3	4	5	6	7	8	9	10	11	12
1	22,500	1	Recipients	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150
2	Hand-on multiplier--> **2**		Followers		4,410	4,410	4,410	4,410	4,410	4,410	4,410	4,410	4,410	4,410
3	45,000	2	Recipients		6,300	6,300	6,300	6,300	6,300	6,300	6,300	6,300	6,300	6,300
4	% hh adopting----> **70%**		Followers			8,820	8,820	8,820	8,820	8,820	8,820	8,820	8,820	8,820
5	29,425	3	Recipients			4,120	4,120	4,120	4,120	4,120	4,120	4,120	4,120	4,120
6	kg seed/hh ----> **5**		Followers				5,767	5,767	5,767	5,767	5,767	5,767	5,767	5,767
7	29,425	4	Recipients				4,120	4,120	4,120	4,120	4,120	4,120	4,120	4,120
8			Followers					5,767	5,767	5,767	5,767	5,767	5,767	5,767
9	13,675	5	Recipients					1,915	1,915	1,915	1,915	1,915	1,915	1,915
10			Followers						2,680	2,680	2,680	2,680	2,680	2,680
11	13,500	6	Recipients						1,890	1,890	1,890	1,890	1,890	1,890
12			Followers							2,646	2,646	2,646	2,646	2,646
13	8,828	7	Recipients							1,236	1,236	1,236	1,236	1,236
14			Followers								1,730	1,730	1,730	1,730
15	8,828	8	Recipients								1,236	1,236	1,236	1,236
16			Followers									1,730	1,730	1,730
17	4,103	9	Recipients									574	574	574
18			Followers										804	804
19	4,050	10	Recipients										567	567
20			Followers					Maximum number of adopting hhs pegged at 70% of total						794
21	Phase III rice hhs---->		0	3,150	13,860	26,800	36,686	39,049	39,896	40,758	41,635	42,527	43,434	44,358
22	Phase II rice hhs---->		9,345	9,345	9,345	9,345	9,345	9,345	9,345	9,345	9,345	9,345	9,345	9,345
23	Total hhs impacted by Program--->		9,345	12,495	23,205	36,145	46,031	48,394	49,241	50,103	50,980	51,872	52,779	53,703
24	Inflated no rice hhs---->		63,390	64,500	65,628	66,777	67,945	69,134	70,344	71,575	72,828	74,102	75,399	76,719
25	% rice hhs impacted by Program -->		15%	19%	35%	54%	68%	70%	70%	70%	70%	70%	70%	70%
26	HH Inflation Factor	1	Rep Seed	Phase III			3,150							
27	1.0175	2	Rep Seed	Phase III				6,300						
28		3	Rep Seed	Phase III					4,120					
29	Total Rice HHs	4	Rep Seed	Phase III						4,120				
30	62,300	5	Rep Seed	Phase III							1,915			
31		6	Rep Seed	Phase III							3,150	1,890		
32		7	Rep Seed	Phase III								6,300	1,236	
33		8	Rep Seed	Phase III									4,120	1,236
34	Phase II HHs	9	Rep Seed	Phase III										4,120
35	9,345	**15%**	Rep Seed	Phase II	3,115	3,115	3,115							
36									3,115	3,115	3,115			
37	% seed stocks ---->	**10%**											3,115	3,115
38	HHs needing replacement seed		0	0	3,115	3,115	6,265	6,300	7,235	7,235	8,180	8,190	8,470	8,470
39	Replacement seed needs (kg)		0	0	15,575	15,575	31,325	31,500	36,173	36,173	40,898	40,950	42,352	42,352
40	Seed stocks required		2,500	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000
41	Annual seed production (kg)		**25,000**	**50,000**	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000
42	Total seed available for distribution (kg)		22,500	45,000	45,000	45,000	45,000	45,000	45,000	45,000	45,000	45,000	45,000	45,000
43	Seed available for new distribution (kg)		22,500	45,000	29,425	29,425	13,675	13,500	8,828	8,828	4,103	4,050	2,648	2,648

Table 3: Summary of Household Phasing for all Foodcrops

Summary - Phasing of rice households - rice seed production 25 Mt in year 1 and 50 Mt per year thereafter a/												
Year-->	1	2	3	4	5	6	7	8	9	10	11	12
Phase III rice hhs---->		3,150	13,860	26,800	36,686	39,049	39,896	40,758	41,635	42,527	43,434	44,358
Phase II rice hhs---->	9,345	9,345	9,345	9,345	9,345	9,345	9,345	9,345	9,345	9,345	9,345	9,345
Total hhs impacted by Program--->	9,345	12,495	23,205	36,145	46,031	48,394	49,241	50,103	50,980	51,872	52,779	53,703
Inflated no rice hhs---->	63,390	64,500	65,628	66,777	67,945	69,134	70,344	71,575	72,828	74,102	75,399	76,719
% rice hhs impacted by Program -->	15%	19%	35%	54%	68%	70%	70%	70%	70%	70%	70%	70%

Summary - Phasing of maize households - maize seed production 25 Mt in year 1, 50 Mt in year 2, 75 Mt in year 3, and 100 Mt in year 4												
Year-->	1	2	3	4	5	6	7	8	9	10	11	12
Phase III maize hhs---->	0	3,150	13,860	29,174	47,908	68,848	87,472	89,224	91,007	92,822	94,668	96,546
Phase II maize hhs---->	12,670	12,670	12,670	12,670	12,670	12,670	12,670	12,670	12,670	12,670	12,670	12,670
Total hhs impacted by Program--->	12,670	15,820	26,530	41,844	60,578	81,518	100,142	101,894	103,677	105,492	107,338	109,216
Inflated no maize hhs---->	128,917	131,173	133,469	135,805	138,181	140,599	143,060	145,563	148,111	150,703	153,340	156,023
% maize hhs impacted by Program -->	10%	12%	20%	31%	44%	58%	70%	70%	70%	70%	70%	70%

Summary - Phasing of peanut households - peanut seed production 25 Mt per year												
Year-->	1	2	3	4	5	6	7	8	9	10	11	12
Phase III peanut hhs---->	0	3,150	5,874	6,003	6,134	6,268	6,404	6,542	6,683	6,826	6,972	7,120
Phase II peanut hhs---->	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
Total hhs impacted by Program--->	1,500	4,650	7,374	7,503	7,634	7,768	7,904	8,042	8,183	8,326	8,472	8,620
Inflated no peanut hhs---->	10,175	10,353	10,534	10,719	10,906	11,097	11,291	11,489	11,690	11,894	12,103	12,314
% peanut hhs impacted by Program ->	15%	45%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%

Summary - Phasing of sweet potato households - 600,000 cuttings produced per year												
Year-->	1	2	3	4	5	6	7	8	9	10	11	12
Phase III s. potato hhs---->	0	3,780	12,852	21,924	30,996	40,068	49,140	53,973	55,134	56,315	57,518	58,741
Phase II s. potato hhs---->	12,375	12,375	12,375	12,375	12,375	12,375	12,375	12,375	12,375	12,375	12,375	12,375
Total hhs impacted by Program--->	12,375	16,155	25,227	34,299	43,371	52,443	61,515	66,348	67,509	68,690	69,893	71,116
Inflated no s. potato hhs---->	83,944	85,413	86,907	88,428	89,976	91,550	93,153	94,783	96,441	98,129	99,846	101,594
% sp hhs impacted by Program -->	15%	19%	29%	39%	48%	57%	66%	70%	70%	70%	70%	70%

Summary - Phasing of cassava households - 600,000 canes produced per year												
Year-->	1	2	3	4	5	6	7	8	9	10	11	12
Phase III cassava hhs---->	0	3,780	12,852	21,924	30,996	40,068	49,140	58,212	67,284	76,356	85,428	90,720
Phase II cassava hhs---->	8,250	8,250	8,250	8,250	8,250	8,250	8,250	8,250	8,250	8,250	8,250	8,250
Total hhs impacted by Program--->	8,250	12,030	21,102	30,174	39,246	48,318	57,390	66,462	75,534	84,606	93,678	98,970
Inflated no. cassava hhs---->	167,888	170,826	173,815	176,857	179,952	183,101	186,305	189,565	192,883	196,258	199,693	203,187
% cas. hhs impacted by Program -->	5%	7%	12%	17%	22%	26%	31%	35%	39%	43%	47%	49%

a/ See Table 2 for an example of detailed household phasing for rice. Note equivalent tables for other crops not presented in this appendix.

2.6. Household Production and Financial Models

Household production and financial models (farm-level) were prepared for all major foodcrops using data and information from MAF's staff and advisors, SoL II's staff, and the World Bank's report: 'Raising Agricultural Productivity - Issues and Options; A Policy Note', August 2009. These models are detailed in Tables 5 to 9, and Table 4 summarizes the key features of each crop model[63].

Table 4: Summary of increased yields and household incomes – by crop

Irrigated Rice	WOP a/	WPb/	Increase	% increase
Cropped area (ha/hh) (50%)---->c/	0.35	0.35	0.00	
Yields (Mt/ha)---->d/	2.50	3.13	0.63	25%
Food production (Mt)---->e/ f/	0.616	0.763	0.147	24%
Gross Margin ($/hh)---->g/	$116	$160	$43	37%
Upland Maize				
Cropped area (ha/hh) (50%)---->	0.35	0.35	0.00	
Yields (Mt/ha)---->	1.44	2.16	0.72	50%
Food production (Mt)---->	0.350	0.532	0.182	52%
Gross Margin ($/hh)---->	$102	$163	$61	59%
Peanut				
Cropped area (ha/hh) (50%)---->	0.15	0.15	0.00	
Yields (Mt/ha)---->	1.50	2.00	0.50	33%
Food production (Mt)---->	0.161	0.210	0.049	30%
Gross Margin ($/hh)---->	$71	$104	$33	47%
Sweet Potato				
Cropped area (ha/hh) (50%)---->	0.025	0.025	0.00	
Yields (Mt/ha)---->	3.10	4.40	1.30	42%
Food production (Mt)---->	0.056	0.077	0.021	38%
Gross Margin ($/hh)---->	$33	$49	$16	49%
Cassava				
Cropped area (ha/hh) (50%)---->	0.10	0.10	0.00	
Yields (Mt/ha)---->	19.00	29.00	10.00	53%
Food production (Mt)---->	1.330	2.030	0.700	53%
Gross Margin ($/hh)---->	$202	$321	$119	59%

a/ WOP = Without Program.

b/ WP = With Program.

c/ Assumes that target hhs only plant 50% of their land to SoL varieties.

d/ Increased food/cash crop production/ha

e/ From areas of different crops planted to SoL varieties

e/ Minor errors due to rounding, **and yields reduced by 30% for conservative estimate.**

g/ Value of increased food/cash crop production grown on areas planted to SoL Varieties.

Table 4 shows that SoL's existing improved varieties have considerable potential to increase foodcrop production. For example, if farmers plant 50% of their land which was previously planted to traditional varieties (see Section 2.1), SoL's currently released improved varieties have

[63] Readers should refer to the individual production and financial models (Tables 5 – 9) for each crop for additional details on how these figures were calculated.

the potential to increase household food production, as follows: (i) an additional 150 kg of rice; (ii) 180 kg of maize; (iii) 50 kg of peanuts; (iv) 20 kg of sweet potato; and (v) 0.7 Mt of cassava.

When a value is placed on increased food production, the figures in Table 4 show that adopting households would generate substantial increases in crop gross margins from the areas planted to improved varieties (assumed to be 50% of area normally planted to each crop). In summary, gross margins from the areas planted with SoL varieties would increase by about 50% or more for non-rice crops, and 40% for rice crops. Incremental annual cash incomes per household would vary from $16 for sweet potato to $119 for cassava. These increases can be attributed solely to SoL's varieties because, apart from some increased labour requirements because of increased crop production, all other costs remain constant. Over time it is expected that some of this increased production would enter the cash markets, either for re-distribution to other food-deficit areas or for use as animal feeds in value adding systems.

Table 5: Traditional and Improved Irrigated Rice Models – Production and Financial

50% of area (0.7 ha) planted with improved varieties		Traditional Irrigated Rice: Gross Margin			Traditional Irrig. Rice: Gross Margin (SoL variety)		
	ha ---->	0.35	kg paddy/ha ->	2,500	0.35	kg paddy /ha	3,125
Cash sales:		Total kg	$/kg	Total $	Total kg	$/kg	Total $
Market sales (kg)		603	**$0.30**	$181	822	$0.30	$247
Home consumption:							
50% of household consumption/exchange (kg)		263	$0.30	$79	263	$0.30	$79
Retained seed (25 kg/ha)		9	$0.30	$3	9	$0.30	$3
Animal feed (kg)		0	$0.30	$0	0	$0.30	$0
Total home consumption:		272		$82	272		$82
Crop value:		875		**$263**	1,094		**$329**
By-products & milling efficiency:		Total kg	$/kg	Total $	Total kg	$/kg	Total $
Cash sales - by-products	1.25	875	$0.0072	$6	1,094	$0.0072	$8
Total crop value:				**$269**			**$337**
CROP INPUTS	ha						
Purchased crop inputs:	**0.35**	Units	$/unit	Total $	Units	$/unit	Total $
Purchased seed (kg)		0.00	$0.00	$0	0.00	$0.50	$0
Fertilizer:	kg/bag						
Nitrogen (urea) (bag)	50	0.00	$25.50	$0	0.00	$25.50	$0
Phosphate (bag)	50	0.00	$38.50	$0	0.00	$38.50	$0
Potash (bag)	50	0.00	$13.00	$0	0.00	$13.00	$0
Purchased animal manure (kg)		0.00	$0.00	$0	0.00	$0.00	$0
Pesticides (sevin) (kg)		0.26	$28.00	$7	0.26	$28.00	$7
Pesticides (dharmbas) (litre)		0.35	$14.00	$5	0.35	$14.00	$5
Small mechanical weeders (annualized - 5 yrs)		0.00	$7.00	$0	0.00	$7.00	$0
Hired labour (days)		13	$2.50	$33	13	$2.50	$33
Meals for hired labour (meals)		13	$0.20	$3	13	$0.20	$3
Irrigation (free water)							
Contract ploughing ($/ha)		0.35	$70.00	$25	0.35	$70.00	$25
Irrigation maintenance (labour only)							
Packing materials (20 kg bags)	20	44.00	$0.30	$13	55.00	$0.30	$17
Processing costs (hand threshing)							
Transport costs (fuel - litre/tonne)	5	3.00	$0.95	$3	3.75	$0.95	$4
String roll (rolls/ha)	3	1.00	$3.00	$3	1.25	$3.00	$4
Total cash inputs:				**$92**			**$98**
Non purchased crop inputs		Units	$/unit	Total $	Units	$/unit	Total $
Own retained seed	kg	9.0	$0.30	$3	9.0	$0.30	$3
Animal manure	kg	1,500	0.005	$8	1,500	0.005	$8
Value of non cash inputs:				$11			$11
Total input value:				**$103**			**$109**

Gross Margin Summary		Traditional Irrigated Rice: Gross Margin			ICM Irrigated Rice: Gross Margin		
		Cash	**Non cash**	**Total**	**Cash**	**Non cash**	**Total**
Gross Income	Crop	$181	$82	$263	$247	$82	$329
	By Prod/Other	$6	$0	$6	$8	$0	$8
Total Gross Income:		$187	$82	$269	$255	$82	$337
Expenditure		$92	$11	$103	$98	$11	$109
Gross Margin:		$95	$71	**$166**	$157	$71	**$228**
					Inc. Gross Margin/hh - SoL variety		**$62**

Labour (days/ha)	**Hired**	**Family**	**Total**	**Hired**	**Family**	**Total**
Clearing grass/burning	0	5	5	0	5	5
Fencing	0	5	5	0	5	5
Preparing nursery	0	6	6	0	3	6
Ploughing (tractor)	0	2	2	0	2	2
Pulling weeds & bundling	0	10	10	0	10	10
Planting	15	20	35	15	20	35
Maintaining borders	0	8	8	0	8	8
Managing water	0	4	4	0	4	4
Maintaining irrigation	0	5	5	0	5	5
Weeding	0	40	40	0	40	40
Spraying chemical	0	4	4	0	4	4
Applying Fertilizer	0	0	0	0		0
Harvesting	22	10	32	28	13	41
Carrying to thresher/thresh	0	3	3	0	4	4
Marketing (2d/t)	0	5	5	0	6	6
Transporting (2d/t)	0	5	5	0	6	6
Other crop management	0	5	5	0	5	5
Total:	**37**	**137**	**174**	**43**	**140**	**186**
Total Labour Days (0.35 ha)	**13**	**48**	**61**	**15**	**49**	**65**
Gross Margin per Family Labour Day:		**$3.46**			**$4.65**	**4**

Note: Assumes that 50% of the cropped area is planted with improved varieties.
Table source: derived from MAF's Commodity Profiles;
Seeds of Life Annual Research Reports; pers com with
MAF's Directors and Advisors, Oxfam and GTZ; and the World Banks APIP Concept Note (2009).

Inc. Financial Benefits/hh---->	**$63**
Financial Price ($/kg)--->	**$0.30**
Opp. Cost Inc. Labor ($1.50/day)---->	**$6**
Economic Price ($/kg)--->	**$0.40**
Inc. Economic Benefits/hh---->	**$78**

Table 6: Traditional and Improved Upland Maize Models – Production and Financial

1. Traditional Maize Crop					
t/ha--->a/	1,440	Prod (kg)->	504	ha---> e/	0.35
Home consumption (50% of requirements) (kg)			263	(5pp x 105kg/pp) b/	
Retained for seed (25 kg/ha)			9		
Animal feed (kg) - scavenging		5%	25	e/ 0.35 ha traditional &	
Losses (kg)		25%	126	0.35 ha improved	
Maize sales (kg)		balance	81		
Gross Income ($)		$/t	Cash	Non-Cash	Total
	Consumption	$380		$103	$103
	Inc l/stock prod'n	$494	$12		$12
	Legumes	$500			$0
	Maize Sales	$380	$31		$31
	Total		$43	$103	**$146**
Production & Storage Costs ($)		kg	$/kg		
	Maize seed				$0
	Storage				$0
	Legume seed				$0
	Chemicals				$0
				ha	**$0**
Gross Margin ($ from traditional maize crop)				**0.35**	**$146**
Family Labour (pers days/ha) d/			People	Days	Total Days
		Land preparation	3	16	48
		Planting	4	8	32
		Weeding 1	2	50	100
		Weeding 2	1	16	16
		Harvesting	3	8	24
		Drying	2	6	12
		Storage	3	2	6
		Shelling	3	4	12
				Total days/ha--->	250
				Total days/farm-->	**88**
Gross Margin per labour day ($)					**$0.58**

SUMMARY	Model 1	Model 2	% Inc.	Factor
Gross Income	$146	$233	59%	1.6
Gross Margin ($/ha)	$146	$233	59%	1.6
Gross Margin ($/day)	$0.58	$0.84	44%	1.4

a/ Source of yield information	Local	Impr	
SOL II reported yields (2009)	1.60	2.40	1.5
SOL II (adj for 10% zero yields)	1.44	2.16	1.5

2. Improved Maize Crop (SOL variety, some livestock)					
t/ha--->	2,160	Prod (kg)->	756	ha---> e/	0.35
Home consumption (50% of requirements) (kg)			263	(5pp x 105kg/pp) b/	
Retained for seed (25 kg/ha)			9		
Animal feed (kg) - managed		20%	151	e/ 0.35 ha traditional &	
Losses (kg)		25%	189	0.35 ha improved	
Maize sales (kg)		balance	144		
Gross Income ($)		$/t	Cash	Non-Cash	Total
	Consumption	$380		$103	$103
	Inc l/stock prod'n c/	$494	$75		$75
	Legumes	$500			$0
	Maize Sales	$380	$55		$55
	Total		$130	$103	**$233**
Production & Storage Costs ($)		kg	$/kg		
	Maize seed				$0
	Storage				$0
	Legume seed				$0
	Chemicals				$0
				ha	**$0**
Gross Margin ($ from improved maize crop)				**0.35**	**$233**
Family Labour (pers days/ha)			People	Days	Total Days
		Land preparation	3	16	48
		Planting	4	8	32
		Weeding 1	2	50	100
		Weeding 2	1	16	16
		Harvesting	3	12	36
		Drying	2	9	18
		Storage	3	3	9
		Shelling	3	6	18
				Total days/ha--->	277
				Total days/farm-->	**97**
Gross Margin per labour day ($)					**$0.84**

Incremental labour days--->	**9**
Financial/Economic Price--->	**380**
Inc. Gross Margin/ hh due to SoL variety---->	**$87**
Inc. Opp. Cost Inc. Labor ($1.50/day)---->	**$14**
Inc. Economic Benefits/hh---->	**$73**

b/ Assumes that the other 50% of family's food requirment comes from 0.35 ha of traditional varieties.
c/ Based on 30% added value throuhg livestock feeding.
d/ Seeds of Life reports 262 labour days per ha.
Table source: derived from MAF's Commodity Profiles; Seeds of Life Annual Research Reports; pers com with MAF's Directors and Advisors, Oxfam and GTZ; and the World Bank's APIP Concept Note (2009).

Table 7: Traditional and Improved Peanut Models – Production and Financial

1. Traditional Peanut Crop						2. Improved Peanut Crop (SoL Varieties)					
Average t/ha--->	**1.50**	Prod (kg)->	225	ha ---->	**0.15**	Average t/ha--->	**2.00**	Prod (kg)->	300	ha planted-->	**0.15**
Home consumption (50% of requirements) (kg)			88	(5 pp x 35 kg/pp)		Home consumption (50% of requirements) (kg)			88	(5 pp x 35 kg/pp)	
Animal feed (kg) - scavenging		0%	0			Animal feed (kg) - managed		0%	0		
Losses (kg)		10%	23			Losses (kg)		10%	30		
Cash sales (kg)		balance	114			Cash sales (kg)		balance	182		
Gross Income ($)		$/t	Cash	Non-Cash	Total	**Gross Income ($)**		$/t	Cash	Non-Cash	Total
	Consumption	**$500**		$44	$44		Consumption	$550		$48	$48
1.2	Inc l/stock prod'n	$600	$0		$0	1.2	Inc l/stock prod'n	$660	$0		$0
	Peanut Sales	$500	$57		$57		Peanut Sales	$550	$100		$100
	Total		$57	$44	**$101**		**Total**		$100	$48	**$149**
Production & Storage Costs ($)		kg	$/kg			**Production & Storage Costs ($)**		kg	$/kg		
	Planting material				$0		Planting material				$0
	Storage				$0		Storage				$0
	Legume seed				$0		Legume seed				$0
	Fertilizer				$0		Fertilizer				$0
	Chemicals				$0		Chemicals				$0
				Total	**$0**					**Total**	**$0**
Gross Margin ($/crop)					**$101**	**Gross Margin ($/crop)**				**Inc GM/hh-->**	**$48**	**$149**
Family Labour (pers days/ha)			People	Days	Total Days	**Family Labour (pers days/ha)**			People	Days	Total Days
		Land preparation	3	4	12			Land preparation	3	4	12
		Planting	4	2	8			Planting	4	2	8
		Weeding 1	2	6	12			Weeding 1	2	6	12
		Weeding 2	1	6	6			Weeding 2	1	6	6
		Harvesting	3	3	9			Harvesting	3	5	15
		Drying	2	2	4			Drying	2	3	6
		Storage	3	2	6			Storage	3	3	9
				Total days/ha--->	57					Total days/ha--->	68
				Total days/farm-->	9					**Total days/farm-->**	10
Gross Margin per labour day ($)					**$1.77**	**Gross Margin per labour day ($)**					**$2.18**

SUMMARY	Model 1	Model 2	% Inc.	Factor
Gross Income	$101	$149	47%	1.5
Gross Margin ($)	$101	$149	47%	1.5
Gross Margin ($/day)	$1.77	$2.18	23%	1.2

Incremental labour days--->	**1**
Financial/Economic Price--->	**$500**
Inc. Econ. Gross Margin/hh---->	**$46**

Table source: derived from MAF's Commodity Profiles (P Jarvis Author); Seeds of Life Annual Research Reports; pers com with MAF's Directors and Advisors, Oxfam and GTZ; and the World Bank's APIP Concept Note (2009).

Table 8: Traditional and Improved Sweet Potato Models – Production and Financial

1. Traditional Sweet Potato Crop						
Average t/ha--->	3.10	Prod (kg)->	155	ha---> a/	0.05	
Home consumption (50% of requirements) (kg)			88	(5 pp x 35 kg/pp)		
Animal feed (kg) - scavenging		10%	16	a/ 0.05 ha traditional &		
Losses (kg)		10%	16	0.05 ha improved		
Cash sales (kg)		balance	35			
Gross Income ($)		$/t	Cash	Non-Cash	Total	
	Consumption	$330		$29	$29	
1.2	Inc l/stock prod'n	$396	$6		$6	
	Root Sales	$330	$12		$12	
	Total		$18	$29	**$47**	
Production & Storage Costs ($)		kg	$/kg			
	Planting material	vegetative			$0	
	Storage				$0	
	Legume seed				$0	
	Fertilizer				$0	
	Chemicals				$0	
				Total	**$0**	
Gross Margin ($/crop)					**$47**	
Family Labour (pers days/ha)			People	Days	Total Days	
		Land preparation	3	4	12	
		Planting	4	2	8	
		Weeding 1	2	5	10	
		Weeding 2	1	5	5	
		Harvesting	3	3	9	
		Drying	2	3	6	
		Storage	3	2	6	
a/ Based on 20% added value through livestock feeding				Total days/ha--->	56	
				Total days/farm-->	3	
Gross Margin per labour day ($)					**$0.83**	

SUMMARY	Model 1	Model 2	% Inc.	Factor
Gross Income	$47	$70	49%	1.5
Gross Margin ($/0.1ha)	$47	$70	49%	1.5
Gross Margin ($/day)	$0.83	$0.93	11%	1.1

2. Improved Sweet Potato Crop (SoL Varieties and Livestock)						
Average t/ha--->	4.40	Prod (kg)->	220	ha---> a/	0.05	
Home consumption (50% of requirements) (kg)			88	(5 pp x 35 kg/pp)		
Animal feed (kg) - managed		30%	66	a/ 0.05 ha traditional &		
Losses (kg)		10%	22	0.05 ha improved		
Cash sales (kg)		balance	44			
Gross Income ($)		$/t	Cash	Non-Cash	Total	
	Consumption	$330		$29	$29	
1.2	Inc l/stock prod'n	$396	$26		$26	
	Root Sales	$330	$15		$15	
	Total		$41	$29	**$70**	
Production & Storage Costs ($)		kg	$/kg			
	Planting material	vegetative			$0	
	Storage				$0	
	Legume seed				$0	
	Fertilizer				$0	
	Chemicals				$0	
				Total	**$0**	
Gross Margin ($/crop)				**Inc GM/hh-->**	**$23**	**$70**
Family Labour (pers days/ha)			People	Days	Total Days	
		Land preparation	3	4	12	
		Planting	4	2	8	
		Weeding 1	2	5	10	
		Weeding 2	1	5	5	
		Harvesting	4	4	16	
		Drying	3	4	12	
		Storage	4	3	12	
				Total days/ha--->	75	
				Total days/farm-->	4	
Gross Margin per labour day ($)					**$0.93**	
				Incremental labour days--->	**1**	
				Financial/Economic Price ($/Mt)--->	**$330**	
				Inc. Econ. Gross Margin/ hh due to SoL variety---->	**$21**	

Table source: derived from MAF's Commodity Profiles; Seeds of Life Annual Research Reports; pers com with MAF's Directors and Advisors, Oxfam and GTZ; and the World Bank's APIP Concept Note (2009).

Table 9: Traditional and Improved Cassava Models – Production and Financial

1. Traditional Cassava Crop					
Average t/ha--->	19.00	Prod (kg)->	1,900	ha --->	0.10
Home consumption (50% of requirements) (kg)			88	(5 pp x 35 kg/pp)	
Animal feed (kg) - scavenging		10%	190		
Losses (kg)		10%	190		
Cash sales (kg)		balance	1,432		

Gross Income ($)		$/t	Cash	Non-Cash	Total
	Consumption	$165		$15	$15
1.2	Inc l/stock prod'n	$198	$38		$38
	Tuber Sales	$165	$236		$236
	Total		$274	$15	**$289**

Production & Storage Costs ($)	kg	$/kg	
Planting material	vegetative		$0
Storage			$0
Legume seed			$0
Fertilizer			$0
Chemicals			$0
		Total	**$0**

Gross Margin ($/crop)	**$289**

Family Labour (pers days/ha)	People	Days	Total Days
Land preparation	3	5	15
Planting	3	3	9
Weeding 1	1	7	7
Weeding 2	1	7	7
Harvesting	3	4	12
Drying	2	3	6
Storage	2	3	6
	Total days/ha--->		62
	Total days/farm-->		6

Gross Margin per labour day ($)	**$4.66**

2. Improved Cassava Crop (SoL Varieties and Livestock)					
Average t/ha--->	29.00	Prod (kg)->	2,900		0.10
Home consumption (50% of requirements) (kg)			88	(5 pp x 35 kg/pp)	
Animal feed (kg) - managed		30%	870		
Losses (kg)		10%	290		
Cash sales (kg)		balance	1,652		

Gross Income ($)		$/t	Cash	Non-Cash	Total
	Consumption	$165		$15	$15
1.2	Inc l/stock prod'n	$198	$172		$172
	Tuber Sales	$165	$273		$273
	Total		$445	$15	**$459**

Production & Storage Costs ($)	kg	$/kg	
Planting material	vegetative		$0
Storage			$0
Legume seed			$0
Fertilizer			$0
Chemicals			$0
		Total	**$0**

Gross Margin ($/crop)	**Inc GM/hh-->**	**$170**	**$459**

Family Labour (pers days/ha)	People	Days	Total Days
Land preparation	3	4	12
Planting	3	2	6
Weeding 1	1	6	6
Weeding 2	1	6	6
Harvesting	3	6	18
Drying	3	5	15
Storage	3	5	15
	Total days/ha--->		78
	Total days/farm-->		8

Gross Margin per labour day ($)			**$5.89**
		Incremental labour days--->	**2**
Financial Price ($/Mt) ----> a/	**$165**	**Economic Price ($/Mt)--->**	**$165**
		Inc. Econ. Gross Margin/ hh---->	**$167**

SUMMARY	Model 1	Model 2	% Inc.	Factor
Gross Income	$289	$459	59%	1.6
Gross Margin ($/0.1ha)	$289	$459	59%	1.6
Gross Margin ($/day)	$4.66	$5.89	26%	1.3

Table source: derived from MAF's Commodity Profiles; Seeds of Life Annual Research Reports; pers com with MAF's Directors and Advisors, Oxfam and GTZ; and the World Bank's APIP Concept Note (2009).

a/ Reduced by 50% to reflect need to export increased tonages of cassava as production increases.

2.7. Economic Analysis

SoL III has the potential to impact very positively on Timor-Leste's rural economy which employs and feeds the majority of the nation's population. When: (i) the financial models in Section 2.6 are scaled up on the basis of the numbers of households adopting SoL's improved foodcrop varieties (see Table 3); (ii) financial prices are adjusted to import parity (for rice and cassava) and the opportunity cost of labour taken into account (see Table 10); the Program's EIRR is estimated to be 26% and the Benefit/Cost Ratio (at 15%) is estimated to be 1.6. These are very robust figures and confirm that investment in adaptive foodcrop research and associated development of a national seed industry has the potential to generate high returns to GoTL's and DP's investment funds, and ensure that the poorer rural populations receive an equitable share of the nation's petro dollars.

2.8. Other Benefits

2.8.1.Increased food production

SoL's improved foodcrop varieties have the potential to contribute substantially to Timor-Leste's national objective of food self-sufficiency, once seed and planting materials have been distributed to the majority of farmers (Table 3). Scaling-up incremental food production per household (Table 11) on the basis of progressive year-by-year adoption rates shows that by PY10 SoL's varieties would be directly linked with the annual production of about an additional 88,000 Mt of food per year, which is only slightly less than the total tonnage of staple food[64] imported in 2009. Furthermore, the bulk of the additional food produced using SoL's new varieties would be upland crops (maize, peanuts, cassava and sweet potato) which are staples for the poorest sector of Timor-Leste's rural communities, who do not grow rice. In the longer-term it is expected that SoL will identify and release improved varieties of a wider range of foodcrops (beans and other legumes, potatoes, wheat, barley, etc.) and this broader mix of foods would have a positive impact on household nutrition.

SoL's total incremental costs (for all three phases) are estimated to be $71.32 million over 20 years. The use of SoL's varieties should result in total incremental food production (over the same period) of 1.58 million Mt. This equates to an incremental cost per Mt of food of about $45, considerably less than the cost of imported food (about $400/Mt landed, and costing Timor-Leste about $45.0 million [2009]).

2.8.2.Social benefits

SoL III is expected to have widespread and significant social impact in the form of: (i) increased supplies of staple foods in areas that currently suffer from prolonged periods of hunger and malnutrition, with associated negative health effects; (ii) equity benefits for non-rice producing communities (particularly upland communities) that do not currently receive the same level of government support for food production[65]; (iii) political benefits in the form of enhanced peace and stability - the last period of civil disturbance in 2006 was reportedly caused by a lack of rice in Dili and district towns; and (iv) gender benefits derived from efforts to ensure that women and particularly WHHs receive equitable access to improved varieties and technical information, direct support for groups of women farmers, and recognition of the distinct roles played by women and men in the various agricultural production

[64] Grain for human consumption, mainly rice (about 110,000 Mt in 2009).
[65] In 2009, National Priority No 1 was food security, but with a strong focus on support for irrigated rice in the form of mechanisation, use of hybrid varieties, and irrigation infrastructure.

calendars[66]. SoL III is unlikely to result in any negative social benefits. Ongoing impact assessment will be conducted by the M&E/ SOSEK Team to track and monitor social and gender impacts, and the broader social implications of the Program's activities, providing a basis for modification of activities as-required.

2.8.3.Private seed producers

SoL III will support the emergence of private sector *formal* seed growers, initially under contract to MAF for the production of SoL varieties. The Program will also support the establishment and operation of community seed production groups (CSPGs) (and follow-on farmer seed marketing groups (FSMGs)) which are expected to eventually supply large tonnages of *informal* seed to the slowly-growing farm market for good quality foodcrop seeds (and eventually vegetative planting materials).

By Year 4 it is expected that SoL III will be producing 50 Mt of rice seed, 100 Mt of maize seed, and 25 Mt of peanut seed. On the basis that contract seed growers might produce an average of 1 Mt of any one type of seed, it is projected that SoL III will engage with and support about 175 contract seed growers. Over time it is reasonable to predict that about 100 of these farmers might evolve into commercial/private sector seed producers[67].

It is more difficult to predict the likely numbers of CSPGs by the end of SoL III as this approach to informal seed production, although well-tested by CARE, has not been supported by SoL in the past. It is inevitable that production, storage and community-related problems will emerge and impact on the rate of group scale-up, and therefore the overall success of SoL III is not predicated on the success of this strategy. However it is not unreasonable to suggest that by the end of Year 5 the majority of *suco* extension officers (SEOs) should have successfully formed and supported about 1,000 CSPGs, which is less than four groups per SOE over five years[68].

2.8.4.Environment

SoL III is unlikely to impact negatively on Timor-Leste's rural environment. The impact on food production will be achieved through the relatively 'simple' intervention of introducing improved varieties of existing foodcrops. On the contrary, a number of positive environment impacts are possible through the development of improved farming systems such as the use of leguminous cover crops, contributing to improved soil condition and reduced soil erosion. It is also possible that, in a subsistence production environment, improved yields for some staple upland foodcrops may result in decreased cropping intensities in fragile upland areas. SoL II commenced collection of seed of local cultivars of Timor-Leste's main foodcrops, with the objective of preserving valuable genetic material which has cultural and risk management roles in indigenous farming systems. This practice will be continued under SoL III. There are no specific Timorese environmental protection and biodiversity conservation laws or regulations which might guide Phase 3. However the Program is cognisant of the need for compliance with Australia's Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act S160).

[66] Prepared by SoL II's SOSEK team and published in Tetum by the Program. These calendars are widely available throughout Timor-Leste.

[67] A SoL II contracted rice seed grower in Baucau District is already growing 5 ha of Nakroma on contract to MAF. He has formed a group of 10 farmers and is showing promising signs of being able to develop into a commercial and non-subsidized seed producer.

[68] CARE, working through directly-employed facilitators and with some support from local SOEs, was able to form and sustain 300 CSPGs (14 groups/ facilitator) in 2009

2.8.5.Scientific

Through its ongoing applied and adaptive research efforts, the Program is expected to generate a range of scientific impacts in relation to the identification of improved varieties and improved farming systems. These scientific impacts will continue to be reported internationally.

Table 10: Program EIRR and B/C Ratio

Household Phasing	Year---->	1	2	3	4	5	6	7	8	9	10+	15	20
No adopting hhs a/---->	Rice	9,345	12,495	23,205	36,145	46,031	48,394	49,241	50,103	50,980	51,872	57,832	65,432
Pegged at 70% of max	Maize	12,670	15,820	26,530	41,844	60,578	81,518	100,142	101,894	103,677	105,492	117,614	133,070
	Peanut	1,500	4,650	7,374	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,769	12,184
	S. Potato	12,375	16,155	25,227	34,299	43,371	52,443	61,515	66,348	67,509	68,690	76,584	86,647
	Cassava	8,250	12,030	21,102	30,174	39,246	48,318	57,390	66,462	75,534	84,606	106,580	120,585
	Total hhs b/	44,140	61,150	103,438	152,461	199,227	240,673	278,288	294,807	307,700	320,660	369,379	417,918

	Inc. Econ Ben/ (US$/hh/yr) c/		Inc. Econ Ben/ (US$/hh/yr) c/ g/
	Rice	$78	$55
	Maize	$0	$0
	Peanut	$46	$32
	S. Potato	$21	$15
	Cassava f/	$167	$117

Inc. Econ. Benefits/ (US$ '000)	1	2	3	4	5	6	7	8	9	10	15	20
Rice	$510	$682	$1,267	$1,973	$2,513	$2,642	$2,689	$2,736	$2,783	$2,832	$3,158	$3,573
Maize	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Peanut	$48	$150	$237	$322	$322	$322	$322	$322	$322	$322	$347	$392
S. Potato	$186	$243	$379	$515	$652	$788	$925	$997	$1,015	$1,032	$1,151	$1,302
Cassava	$966	$1,409	$2,471	$3,534	$4,596	$5,659	$6,721	$7,783	$8,846	$9,908	$12,482	$14,122
Total Inc Econ Benefits (US$ '000)	$1,711	$2,484	$4,355	$6,345	$8,083	$9,411	$10,656	$11,838	$12,966	$14,095	$17,137	$19,389
Total Inc Econ Benefits (A$ '000) d/	$1,801	$2,614	$4,584	$6,679	$8,509	$9,906	$11,217	$12,461	$13,648	$14,837	$18,039	$20,409
Inc. Program Costs (A$ '000) e/	$18,629	$5,186	$5,773	$4,311	$3,322	$2,524	$2,524	$2,524	$2,524	$2,524	$2,524	$2,524
Net Inc Econ Benefits (A$ '000)	-$16,828	-$2,571	-$1,189	$2,367	$5,187	$7,383	$8,693	$9,938	$11,125	$12,313	$15,515	$17,886

a/ Max % of target families - to reflect conservative approach----> **70%**

b/ Note: hhs grow more than one crop hence totals which are greater than the total no of hhs in TL. **B/C ratio @----> 15% 1.6**

c/ Rice price (US$/Mt) increased from $300 to $400 = CIF cost of imported rice, less opp. cost of labour @ US$1.50/day.

d/ Including sunk costs Phases I and II, inflated by 3% pa; total A$('000) ----------> **$12,221** **EIRR----> 26%**

e/ Adjusted for exchange rates = **0.95**

f/ Financial and economic prices reduced by 50% because of the need to export as production increases.

Table 11: National Incremental Food Production

Household Phasing	Year---->	1	2	3	4	5	6	7	8	9	10+	15	20
	Rice	9,345	12,495	23,205	36,145	46,031	48,394	49,241	50,103	50,980	51,872	57,832	65,432
	Maize	12,670	15,820	26,530	41,844	60,578	81,518	100,142	101,894	103,677	105,492	117,614	133,070
	Peanut	1,500	4,650	7,374	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,769	12,184
	S. Potato	12,375	16,155	25,227	34,299	43,371	52,443	61,515	66,348	67,509	68,690	76,584	86,647
	Cassava	8,250	12,030	21,102	30,174	39,246	48,318	57,390	66,462	75,534	84,606	106,580	120,585
	Total hhs	44,140	61,150	103,438	152,461	199,227	240,673	278,288	294,807	307,700	320,660	369,379	417,918

Inc. Crop Production per hh (Mt) a/	
Rice	0.147
Maize	0.182
Peanut	0.049
S. Potato	0.021
Cassava	0.700

Inc. Crop Production (Mt)	1	2	3	4	5	6	7	8	9	10	15	20
Rice	1,374	1,837	3,411	5,313	6,767	7,114	7,238	7,365	7,494	7,625	8,501	9,619
Maize	2,306	2,879	4,828	7,616	11,025	14,836	18,226	18,545	18,869	19,200	21,406	24,219
Peanut	74	228	361	490	490	490	490	490	490	490	528	597
S. Potato	260	339	530	720	911	1,101	1,292	1,393	1,418	1,442	1,608	1,820
Cassava	5,775	8,421	14,771	21,122	27,472	33,823	40,173	46,523	52,874	59,224	74,606	84,410
Total Inc Crop Production/yr (Mt)	9,788	13,704	23,902	35,261	46,665	57,364	67,419	74,317	81,145	87,981	106,649	120,664

Total Inc Crop Production (Mt)	1,578,210
Total Inc Costs (US$) (20 yrs)	$73,006,163
Total Inc Costs/ (Mt food)	**$46**

a/ 70% of maximun for conservative approach.

Annex 1: Detailed Household Phasing by Crop Type

Table A1.1: Household Phasing for Rice

Phasing of rice households - rice seed production 25 Mt in year 1 and 50 Mt per year thereafter														
Row No.	Ph III new seed dist'n (kg)	Year-->	1	2	3	4	5	6	7	8	9	10	11	12
1	22,500	1	Recipients	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150
2	Hand-on multiplier--> 2		Followers		4,410	4,410	4,410	4,410	4,410	4,410	4,410	4,410	4,410	4,410
3	45,000	2	Recipients		6,300	6,300	6,300	6,300	6,300	6,300	6,300	6,300	6,300	6,300
4	% hh adopting----> 70%		Followers			8,820	8,820	8,820	8,820	8,820	8,820	8,820	8,820	8,820
5	29,425	3	Recipients			4,120	4,120	4,120	4,120	4,120	4,120	4,120	4,120	4,120
6	kg seed/hh ----> 5		Followers				5,767	5,767	5,767	5,767	5,767	5,767	5,767	5,767
7	29,425	4	Recipients				4,120	4,120	4,120	4,120	4,120	4,120	4,120	4,120
8			Followers					5,767	5,767	5,767	5,767	5,767	5,767	5,767
9	13,675	5	Recipients					1,915	1,915	1,915	1,915	1,915	1,915	1,915
10			Followers						2,680	2,680	2,680	2,680	2,680	2,680
11	13,500	6	Recipients						1,890	1,890	1,890	1,890	1,890	1,890
12			Followers							2,646	2,646	2,646	2,646	2,646
13	8,828	7	Recipients							1,236	1,236	1,236	1,236	1,236
14			Followers								1,730	1,730	1,730	1,730
15	8,828	8	Recipients								1,236	1,236	1,236	1,236
16			Followers									1,730	1,730	1,730
17	4,103	9	Recipients									574	574	574
18			Followers										804	804
19	4,050	10	Recipients										567	567
20			Followers					Maximum number of adopting hhs pegged at 70% of total						794
21	Phase III rice hhs---->		0	3,150	13,860	26,800	36,686	39,049	39,896	40,758	41,635	42,527	43,434	44,358
22	Phase II rice hhs---->		9,345	9,345	9,345	9,345	9,345	9,345	9,345	9,345	9,345	9,345	9,345	9,345
23	Total hhs impacted by Program--->		9,345	12,495	23,205	36,145	46,031	48,394	49,241	50,103	50,980	51,872	52,779	53,703
24	Inflated no rice hhs---->		63,390	64,500	65,628	66,777	67,945	69,134	70,344	71,575	72,828	74,102	75,399	76,719
25	% rice hhs impacted by Program -->		15%	19%	35%	54%	68%	70%	70%	70%	70%	70%	70%	70%
26	HH Inflation Factor	1	Rep Seed	Phase III			3,150							
27	1.0175	2	Rep Seed	Phase III				6,300						
28		3	Rep Seed	Phase III					4,120					
29	Total Rice HHs	4	Rep Seed	Phase III						4,120				
30	62,300	5	Rep Seed	Phase III							1,915			
31		6	Rep Seed	Phase III							3,150	1,890		
32		7	Rep Seed	Phase III								6,300	1,236	
33		8	Rep Seed	Phase III									4,120	1,236
34	Phase II HHs	9	Rep Seed	Phase III										4,120
35	9,345	15%	Rep Seed	Phase II	3,115	3,115	3,115							
36									3,115	3,115	3,115			
37	% seed stocks ----> 10%												3,115	3,115
38	HHs needing replacement seed		0	0	3,115	3,115	6,265	6,300	7,235	7,235	8,180	8,190	8,470	8,470
39	Replacement seed needs (kg)		0	0	15,575	15,575	31,325	31,500	36,173	36,173	40,898	40,950	42,352	42,352
40	Seed stocks required		2,500	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000
41	Annual seed production (kg)		**25,000**	**50,000**	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000
42	Total seed available for distribution (kg)		22,500	45,000	45,000	45,000	45,000	45,000	45,000	45,000	45,000	45,000	45,000	45,000
43	Seed available for new distribution (kg)		22,500	45,000	29,425	29,425	13,675	13,500	8,828	8,828	4,103	4,050	2,648	2,648

Table A1.2: Household Phasing for Maize

Phasing of maize households - maize seed production 25 Mt in year 1, 50 Mt in year 2, 75 Mt in year 3, and 100 Mt in year 4													
Ph III new seed dist'n (kg)	Year-->	1	2	3	4	5	6	7	8	9	10	11	12
22,500	1	Recipients	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150
Hand-on multiplier--> **2**		Followers		4,410	4,410	4,410	4,410	4,410	4,410	4,410	4,410	4,410	4,410
45,000	2	Recipients		6,300	6,300	6,300	6,300	6,300	6,300	6,300	6,300	6,300	6,300
% hh adopting----> **70%**		Followers			8,820	8,820	8,820	8,820	8,820	8,820	8,820	8,820	8,820
46,383	3	Recipients			6,494	6,494	6,494	6,494	6,494	6,494	6,494	6,494	6,494
kg seed/hh ----> **5**		Followers				9,091	9,091	9,091	9,091	9,091	9,091	9,091	9,091
68,883	4	Recipients				9,644	9,644	9,644	9,644	9,644	9,644	9,644	9,644
		Followers					13,501	13,501	13,501	13,501	13,501	13,501	13,501
53,133	5	Recipients					7,439	7,439	7,439	7,439	7,439	7,439	7,439
		Followers						10,414	10,414	10,414	10,414	10,414	10,414
58,500	6	Recipients						8,190	8,190	8,190	8,190	8,190	8,190
		Followers							11,466	11,466	11,466	11,466	11,466
36,415	7	Recipients							5,098	5,098	5,098	5,098	5,098
		Followers								7,137	7,137	7,137	7,137
20,665	8	Recipients								2,893	2,893	2,893	2,893
		Followers									4,050	4,050	4,050
15,940	9	Recipients									2,232	2,232	2,232
		Followers										3,124	3,124
17,550	10	Recipients										2,457	2,457
		Followers					Maximum number of adopting hhs pegged at 70% of total						3,440
Phase III maize hhs---->		0	3,150	13,860	29,174	47,908	68,848	87,472	89,224	91,007	92,822	94,668	96,546
Phase II maize hhs---->		12,670	12,670	12,670	12,670	12,670	12,670	12,670	12,670	12,670	12,670	12,670	12,670
Total hhs impacted by Program--->		12,670	15,820	26,530	41,844	60,578	81,518	100,142	101,894	103,677	105,492	107,338	109,216
Inflated no maize hhs---->		128,917	131,173	133,469	135,805	138,181	140,599	143,060	145,563	148,111	150,703	153,340	156,023
% maize hhs impacted by Program -->		10%	12%	20%	31%	44%	58%	70%	70%	70%	70%	70%	70%
HH Inflation Factor	1	Rep Seed	Phase III			3,150							
1.0175	2	Rep Seed	Phase III				6,300						
	3	Rep Seed	Phase III					6,494					
Total Maize HHs	4	Rep Seed	Phase III						9,644				
126,700	5	Rep Seed	Phase III							7,439			
	6	Rep Seed	Phase III							3,150	8,190		
	7	Rep Seed	Phase III								6,300	5,098	
	8	Rep Seed	Phase III									6,494	2,893
Phase II HHs	9	Rep Seed	Phase III										9,644
12,670	**10%**	Rep Seed	Phase II	4,223	4,223	4,223							
								4,223	4,223	4,223			
% seed stocks ---->	**10%**											4,223	4,223
HHs needing replacement seed		0	0	4,223	4,223	7,373	6,300	10,717	13,867	14,812	14,490	15,815	16,760
Replacement seed needs (kg)		0	0	21,117	21,117	36,867	31,500	53,585	69,335	74,060	72,450	79,076	83,801
Seed stocks required		2,500	5,000	7,500	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Annual seed production (kg)		**25,000**	**50,000**	**75,000**	**100,000**	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
Total seed available for distribution (kg)		22,500	45,000	67,500	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000
Seed available for new distribution (kg)		22,500	45,000	46,383	68,883	53,133	58,500	36,415	20,665	15,940	17,550	10,925	6,200

Table A1.3: Household Phasing for Peanuts

Phasing of peanut households - peanut seed production 25 Mt per year													
Ph III new seed dist'n (kg)	Year-->	1	2	3	4	5	6	7	8	9	10	11	12
22,500	1	Recipients	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150
Hand-on multiplier--> **2**		Followers		4,410	4,410	4,410	4,410	4,410	4,410	4,410	4,410	4,410	4,410
22,500	2	Recipients		3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150
% hh adopting----> **70%**		Followers			4,410	4,410	4,410	4,410	4,410	4,410	4,410	4,410	4,410
20,000	3	Recipients			2,800	2,800	2,800	2,800	2,800	2,800	2,800	2,800	2,800
kg seed/hh ----> **5**		Followers				3,920	3,920	3,920	3,920	3,920	3,920	3,920	3,920
20,000	4	Recipients				2,800	2,800	2,800	2,800	2,800	2,800	2,800	2,800
		Followers					3,920	3,920	3,920	3,920	3,920	3,920	3,920
4,250	5	Recipients					595	595	595	595	595	595	595
		Followers						833	833	833	833	833	833
6,750	6	Recipients						945	945	945	945	945	945
		Followers							1,323	1,323	1,323	1,323	1,323
6,000	7	Recipients							840	840	840	840	840
		Followers								1,176	1,176	1,176	1,176
6,000	8	Recipients								840	840	840	840
		Followers									1,176	1,176	1,176
1,275	9	Recipients									179	179	179
		Followers										250	250
2,025	10	Recipients										284	284
		Followers					Maximum number of adopting hhs pegged at 70% of total						397
Phase III peanut hhs---->		0	3,150	5,874	6,003	6,134	6,268	6,404	6,542	6,683	6,826	6,972	7,120
Phase II peanut hhs---->		1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
Total hhs impacted by Program--->		1,500	4,650	7,374	7,503	7,634	7,768	7,904	8,042	8,183	8,326	8,472	8,620
Inflated no peanut hhs---->		10,175	10,353	10,534	10,719	10,906	11,097	11,291	11,489	11,690	11,894	12,103	12,314
% peanut hhs impacted by Program -->		15%	45%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%
HH Inflation Factor	1	Rep Seed	Phase III			3,150							
1.0175	2	Rep Seed	Phase III				3,150						
	3	Rep Seed	Phase III					2,800					
Total Peanut HHs	4	Rep Seed	Phase III						2,800				
10,000	5	Rep Seed	Phase III							595			
	6	Rep Seed	Phase III							3,150	945		
	7	Rep Seed	Phase III								3,150	840	
	8	Rep Seed	Phase III									2,800	840
Phase II HHs	9	Rep Seed	Phase III										2,800
1,500	**15%**	Rep Seed	Phase II	500	500	500							
								500	500	500			
% seed stocks ---->	**10%**											500	500
HHs needing replacement seed		0	0	500	500	3,650	3,150	3,300	3,300	4,245	4,095	4,140	4,140
Replacement seed needs (kg)		0	0	2,500	2,500	18,250	15,750	16,500	16,500	21,225	20,475	20,700	20,700
Seed stocks required		2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500
Annual seed production (kg)		**25,000**	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000
Total seed available for distribution (kg)		22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500
Seed available for new distribution (kg)		22,500	22,500	20,000	20,000	4,250	6,750	6,000	6,000	1,275	2,025	1,800	1,800

Table A1.4: Household Phasing for Sweet Potato

Phasing of sweet potato households - 600,000 cuttings produced per year													
Ph III cutting dist'n (no.)	Year-->	1	2	3	4	5	6	7	8	9	10	11	12
540,000	1	Recipients	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780
Hand-on multiplier--> **2**		Followers		5,292	5,292	5,292	5,292	5,292	5,292	5,292	5,292	5,292	5,292
540,000	2	Recipients		3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780
% hh adopting----> **70%**		Followers			5,292	5,292	5,292	5,292	5,292	5,292	5,292	5,292	5,292
540,000	3	Recipients			3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780
cuttings/hh ----> **100**		Followers				5,292	5,292	5,292	5,292	5,292	5,292	5,292	5,292
540,000	4	Recipients				3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780
		Followers					5,292	5,292	5,292	5,292	5,292	5,292	5,292
540,000	5	Recipients					3,780	3,780	3,780	3,780	3,780	3,780	3,780
		Followers						5,292	5,292	5,292	5,292	5,292	5,292
540,000	6	Recipients						3,780	3,780	3,780	3,780	3,780	3,780
		Followers							5,292	5,292	5,292	5,292	5,292
540,000	7	Recipients							3,780	3,780	3,780	3,780	3,780
		Followers								5,292	5,292	5,292	5,292
540,000	8	Recipients								3,780	3,780	3,780	3,780
		Followers									5,292	5,292	5,292
540,000	9	Recipients									3,780	3,780	3,780
		Followers										5,292	5,292
540,000	10	Recipients										3,780	3,780
		Followers					Maximum number of adopting hhs pegged at 70% of total						5,292
Phase III sweet potato hhs---->		0	3,780	12,852	21,924	30,996	40,068	49,140	53,973	55,134	56,315	57,518	58,741
Phase II sweet potato hhs---->		12,375	12,375	12,375	12,375	12,375	12,375	12,375	12,375	12,375	12,375	12,375	12,375
Total hhs impacted by Program--->		12,375	16,155	25,227	34,299	43,371	52,443	61,515	66,348	67,509	68,690	69,893	71,116
Inflated no s.potato hhs---->		83,944	85,413	86,907	88,428	89,976	91,550	93,153	94,783	96,441	98,129	99,846	101,594
% s. potato hhs impacted by Program -->		15%	19%	29%	39%	48%	57%	66%	70%	70%	70%	70%	70%
HH Inflation Factor	1	Rep Cutt'gs	Phase III										
1.0175	2	Rep Cutt'gs	Phase III										
	3	Rep Cutt'gs	Phase III										
Total S. Potato HHs	4	Rep Cutt'gs	Phase III										
82,500	5	Rep Cutt'gs	Phase III										
	6	Rep Cutt'gs	Phase III										
	7	Rep Cutt'gs	Phase III										
	8	Rep Cutt'gs	Phase III										
Phase II HHs	9	Rep Cutt'gs	Phase III										
12,375	**15%**	Rep Cutt'gs	Phase II										
% cutting stocks ---->	**10%**											0	0
HHs needing replacement cuttings		0	0	0	0	0	0	0	0	0	0	0	0
Replacement cutting needs		0	0	0	0	0	0	0	0	0	0	0	0
Cutting stocks required		60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000
Annual cutting production		**600,000**	600,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000
Total cuttings available for distribution		540,000	540,000	540,000	540,000	540,000	540,000	540,000	540,000	540,000	540,000	540,000	540,000
Cuttings available for new distribution		540,000	540,000	540,000	540,000	540,000	540,000	540,000	540,000	540,000	540,000	540,000	540,000

Assumes that sweet potato remains true to type and therefore there is no need for replacement cuttings after (say) five years.

Table A1.5: Household Phasing for Cassava

Phasing of cassava households - 600,000 canes produced per year													
Ph III cane dist'n (no.)	Year-->	1	2	3	4	5	6	7	8	9	10	11	12
540,000	1	Recipients	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780
Hand-on multiplier--> **2**		Followers		5,292	5,292	5,292	5,292	5,292	5,292	5,292	5,292	5,292	5,292
540,000	2	Recipients		3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780
% hh adopting----> **70%**		Followers			5,292	5,292	5,292	5,292	5,292	5,292	5,292	5,292	5,292
540,000	3	Recipients			3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780
canes/hh ----> **100**		Followers				5,292	5,292	5,292	5,292	5,292	5,292	5,292	5,292
540,000	4	Recipients				3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780
		Followers					5,292	5,292	5,292	5,292	5,292	5,292	5,292
540,000	5	Recipients					3,780	3,780	3,780	3,780	3,780	3,780	3,780
		Followers						5,292	5,292	5,292	5,292	5,292	5,292
540,000	6	Recipients						3,780	3,780	3,780	3,780	3,780	3,780
		Followers							5,292	5,292	5,292	5,292	5,292
540,000	7	Recipients							3,780	3,780	3,780	3,780	3,780
		Followers								5,292	5,292	5,292	5,292
540,000	8	Recipients								3,780	3,780	3,780	3,780
		Followers									5,292	5,292	5,292
540,000	9	Recipients									3,780	3,780	3,780
		Followers										5,292	5,292
540,000	10	Recipients										3,780	3,780
		Followers					Maximum number of adopting hhs pegged at 70% of total						5,292
Phase III cassava hhs---->		0	3,780	12,852	21,924	30,996	40,068	49,140	58,212	67,284	76,356	85,428	90,720
Phase II cassava hhs---->		8,250	8,250	8,250	8,250	8,250	8,250	8,250	8,250	8,250	8,250	8,250	8,250
Total hhs impacted by Program--->		8,250	12,030	21,102	30,174	39,246	48,318	57,390	66,462	75,534	84,606	93,678	98,970
Inflated cassava hhs---->		167,888	170,826	173,815	176,857	179,952	183,101	186,305	189,565	192,883	196,258	199,693	203,187
% cassava hhs impacted by Program -->		5%	7%	12%	17%	22%	26%	31%	35%	39%	43%	47%	49%
HH Inflation Factor	1	Rep Canes	Phase III										
1.0175	2	Rep Canes	Phase III										
	3	Rep Canes	Phase III										
Total Cassava HHs	4	Rep Canes	Phase III										
165,000	5	Rep Canes	Phase III										
	6	Rep Canes	Phase III										
	7	Rep Canes	Phase III										
	8	Rep Canes	Phase III										
Phase II HHs	9	Rep Canes	Phase III										
8,250	**5%**	Rep Canes	Phase II										
% cutting stocks ---->	**10%**											0	0
HHs needing replacement canes		0	0	0	0	0	0	0	0	0	0	0	0
Replacement cane needs		0	0	0	0	0	0	0	0	0	0	0	0
Cane stocks required		60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000
Annual cane production		**600,000**	600,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000
Total canes available for distribution		540,000	540,000	540,000	540,000	540,000	540,000	540,000	540,000	540,000	540,000	540,000	540,000
Canes available for new distribution		540,000	540,000	540,000	540,000	540,000	540,000	540,000	540,000	540,000	540,000	540,000	540,000

Assumes that cassava remains true to type and therefore there is no need for replacement canes after (say) five years.

APPENDIX 9

DRAFT TOR FOR
LONG-TERM ADVISER POSITIONS

East Timor Seeds of Life Program

TERMS OF REFERENCE

Position Title: Australian Team Leader (ATL)

1. BRIEF EXPLANATION OF ROLE

Responsible to: the Australian Program Coordinator

Works together with: In addition to leading and mentoring the TA Team, The Team Leader will be expected to develop and maintain a close working relationship with the Director General of MAF as his primary counterpart, as well as with the Directors of the various MAF Divisions directly involved in implementation.

Location: Dili, with travel to districts as required.

Duration: 5 years from January 2011 through to December 2015.

2. GENERAL DESCRIPTION:

The SoLTL will:

- provide strategic and operational leadership to the Program, ensuring it is implemented in accordance with the intention of the PDD, the RoU between ACIAR and AusAID, and approved Annual Plans;
- ensure the overall coherence and quality of program implementation, team management, personnel development, stakeholder relations, reporting and adherence to contract conditions;
- pay particular attention to establishing a strong working relationship with the DG of MAF and the various Divisional Directors involved in implementation;
- be directly responsible for leading and coordinating the implementation of activities designed to strengthen MAF's capacity to manage the national seed system (i.e. Component 4);
- represent the Program on behalf of AusAID and ACIAR in all dealings with GoTL and outside parties.

3. KEY TASKS AND RESPONSIBILITIES

The SoLTL will:

1. Ensure the strategic direction of the Program is maintained in accordance with the PDD.
2. Together with the APC, guide and mentor Program personnel in the planning and implementation of activities.
3. Ensure collaborative working relationships are developed amongst primary stakeholders, including key GoTL agencies (especially MAF), AusAID, and ACIAR.
4. Establish and maintain a close working relationship with the DG of MAF as a primary counterpart, and through the DG actively promote coordination between the various divisions of MAF involved in implementation.
5. Coordinate 2-weekly management meetings to be held with the DG and relevant Divisional Directors of MAF and coordinate the implementation of decisions arising from these meetings.
6. Provide policy and contextual analysis as required to support the PSC and MAF exercise their responsibilities related to development of a national seed system.
7. Together with DG MAF and AusAID Post finalise the Transition Strategy and oversight implementation of this strategy.

8. Be responsible for leading and coordinating the implementation of activities designed to improve MAF's capacity to manage a national seed system (i.e.Component 4 activities), ensuring that relevant Component 1-3 activities are appropriately coordinated in this direction.
9. Oversight the establishment and operation of Program planning, reporting and M&E systems, ensuring that these are appropriately integrated with relevant MAF systems.
10. Establish robust financial and administrative systems for the Program. Monitor the use and acquittal of Program funds, ensuring funds are applied in line with the PDD and approved Annual Plans. Manage the human and financial resources of the Program in accordance with Commonwealth Procurement Guidelines and relevant AusAID, ACIAR and GoTL policies.
11. Coordinate the preparation of all reports, workplans and manuals.
12. Be responsible for OH&S, quality assurance and overall performance of the Program.
13. Liaise with other donors working in TL and actively investigate opportunities for linking with other initiatives involved in improving food security in TL.
14. Maintain a responsive relationship with the PSC and AusAID by providing timely information, advice and recommendations on all SoL III matters.
15. Analyse and synthesise Program experiences and actively contribute to the on-going refinement of the SoL III design.

4. SKILLS AND EXPERIENCE
(Qualifications/Experience/Skills/Knowledge)

The successful candidate will have:

Essential

1. A post-graduate degree from a recognized University in a relevant field – preferably agronomy or rural development.
2. At least 10 year's experience working in international development.
3. A general understanding of the process and issues involved in identifying improved varieties of staple foodcrops and establishing systems for improving access to seed for farmers.
4. Proven managerial skills, particularly in:
    a. Planning, administration and financial management of donor projects;
    b. Working with and coordinating a team of professionals;
    c. Coordinating geographically dispersed development activities;
    d. Leading AusAID or other donor development activities; and
    e. Liaising with government and non-government organizations.
5. Demonstrated ability to establish strong working relationships with national counterparts at a senior level.
6. Well developed skills in: inter-personal communication; report writing; numeracy; analysis; and networking.
7. Advanced computer literacy.
8. Fluency in English.

Desirable

1. Experience in SE Asia or East Timor.
2. Basic proficiency in either Tetun, Bahasa Indonesian or Portuguese.

East Timor Seeds of Life Program

TERMS OF REFERENCE

Position Title: Research Adviser (RA)

1. BRIEF EXPLANATION OF ROLE

Responsible to: the SoL Team Leader.

Works together with: The Director of NDR&SS, and through the Director staff of NDR&SS staff involved in variety evaluation work being conducted on MAF's network of Research Centres and Stations.

Location: Dili, with travel to districts as required.

Duration: 5 years from January 2011 through to December 2015.

2. GENERAL DESCRIPTION:

The RA will:

- take the lead in providing technical support to MAF for the implementation of Component 1 (Evaluation of Improved Foodcrop Varieties), ensuring it is implemented in accordance with the intention of the PDD, the RoU between ACIAR and AusAID, and approved Annual Plans;
- establish and maintain a close primary counterpart relationship with the Director of the NDR&SS, and through him work closely to build the capacity of the Directorate to manage the introduction, evaluation and release of improved foodcrop varieties;
- support the ATL with the implementation of Component 4 activities (Seed System Management), as required.

3. KEY TASKS AND RESPONSIBILITIES

The RA will:

1. Establish a close working relationship with the Director of NDR&SS as the primary counterpart, and actively guide and mentor staff of the Directorate involved in the implementation of Component 1 activities.
2. Advise on the scope of the adaptive research program in terms of species to be evaluated; identify possible sources of genetic material for screening (from CGIAR Centres and National programs); and facilitate arrangements to import this genetic material for in-country evaluation.
3. Provide technical advice relating to the evaluation of varieties on-station.
4. Provide technical advice relating to the implementation of the OFDT program as an essential final stage of variety evaluation.
5. Support the preparation of submissions to the Variety Release Committee for varieties that have been evaluated and selected for final release.
6. Provide technical advice on the production of foundation seed, including volumes required (in line with projected demand for seed of released varieties), production systems including required QA measures, and production locations.
7. Identify the need for, plan and manage the implementation of targeted capacity building activities designed to support the professional development of research and OFDT staff to manage all phases of the research cycle, spanning objective setting, planning and implementation of trials, analysis, and reporting.

8. Identify the need for and advise MAF on the development of new/ revised policies and institutional procedures/ systems for more effective and efficient implementation of R&D relating to introduction of improved foodcrop varieties.
9. Further assess the need for additional Research Stations at a mid-altitude site on red acid soils (Darasula), at a high altitude site (probably in Ainaro), and in an irrigated rice growing area (probably Bobonaro or Baucau); assist with the preparation of plans for the development of additional research infrastructure as required; and provide technical support for the implementation of these plans.
10. Coordinate the collection of seed of local cultivars of TL's main foodcrops with the objective of preserving this genetic material.
11. Plan, coordinate and monitor the activities of the 3 Regional Advisers insofar as they relate to implementation Component 1 activities.
12. Provide input as required for the development of improved variety technical and promotional materials.
13. Liaise with the Climate Change Specialist in relation to the need for predicted climate change impacts to be reflected in the R&D program, and promote the need for this to R&D decision-makers within MAF.
14. Assist the ATL with overarching activities designed to strengthen MAF's capacity to manage the national seed system, as required (i.e. Component 4 activities).
15. Assist the ATL to establish and manage systems for planning, monitoring and evaluating Program activities.

4. SKILLS AND EXPERIENCE
(Qualifications/Experience/Skills/Knowledge)

The successful candidate will have:

Essential

1. A post-graduate degree from a recognized University in agronomy.
2. At least 5 year's experience working with agricultural R&D organisations, including LT implementation experience in a developing country.
3. A sound understanding of the process and issues involved in evaluating and releasing improved varieties of staple foodcrops in a developing country.
4. Proven technical R&D skills, including:
    a. Design of R&D trials, on station and on-farm;
    b. Managing the implementation of trials;
    c. Results analysis; and
    d. Results reporting.
5. Demonstrated ability to establish strong working relationships with and coordinate a small team of national counterparts.
6. Well developed skills in: inter-personal communication; report writing; numeracy; analysis; and networking.
7. Advanced computer literacy.
8. Fluency in English.

Desirable

1. Experience in SE Asia or East Timor.
2. Basic proficiency in either Tetun, Bahasa Indonesia or Portugese.

East Timor Seeds of Life Program

TERMS OF REFERENCE

Position Title: Formal Seed Production Adviser (FSPA)

1. BRIEF EXPLANATION OF ROLE

Responsible to: the Australian Team Leader.

Works together with: (i) the Director of NDA&H and, through the Director, staff of NDA&H staff involved in the production, processing and distribution of formal seed; and (ii) the District Extension Offices.

Location: Dili, with travel to districts as required.

Duration: 5 years from January 2011 through to December 2015.

2. GENERAL DESCRIPTION:

The FSPA will:

- take the lead in providing technical support to MAF for the implementation of Component 2 (Formal Seed production and Distribution), ensuring it is implemented in accordance with the intention of the PDD, the RoU between ACIAR and AusAID, and approved Annual Plans;
- establish and maintain a close primary counterpart relationship with the Director of the NDA&H, and through him work closely to build the capacity of the Directorate to manage the production, processing and distribution of formal seed of released varieties;
- support the SoLTL with the implementation of Component 4 activities (Seed System Management), as required.

3. KEY TASKS AND RESPONSIBILITIES

The FSPA will:

1. Establish a close working relationship with the Director of NDA&H as the primary counterpart, and actively guide and mentor staff of the Directorate involved in the implementation of Component 2 activities.
2. Advise on the scope and implementation of formal seed (true seed) production activities (e.g. maize and rice) in terms of required volumes (matched to demand projections taking into account the informal seed production activities supported under Component 3); production systems; preferred production locations; number of growers that need to be contracted; and contracting guidelines.
3. Advise on the scope and implementation of activities for producing planting material of vegetatively propagated species (e.g. cassava and sweet potato) in terms of required volumes (matched to demand projections); number, size and location of nurseries to be established; production and distribution systems; and contracting guidelines.
4. Provide technical advice on the requirement for and establishment of additional seed processing facilities, including location, capacity, technical specifications, and operating procedures.
5. Design and oversight the implementation of QA procedures covering the production, processing and distribution of formal seed and planting materials
6. Advise on the distribution of formal seed and planting materials, including preferred recipients, distribution channels and distribution logistics.

7. Identify the need for, plan and manage the implementation of targeted capacity building activities designed to support the professional development of MAF staff involved in the production, processing and distribution of formal seed and planting materials
8. Identify the need for and advise MAF on the development of new/ revised policies and institutional procedures/ systems for more effective and efficient implementation of formal seed production, processing and distribution activities.
9. Plan, coordinate and monitor the activities of the 3 Regional Advisers insofar as they relate to implementation of Component 2 activities.
10. Provide input as required for the development of improved variety technical and promotional materials.
11. Assist the ATL with overarching activities designed to strengthen MAF's capacity to manage the national seed system as required (i.e. Component 4 activities).
12. Assist the ATL to establish and manage systems for planning, monitoring and evaluating program activities.

4. SKILLS AND EXPERIENCE
(Qualifications/Experience/Skills/Knowledge)

The successful candidate will have:

Essential

1. A graduate degree from a recognized University in agronomy and/or post-harvest handling.
2. At least 5 year's experience working in the seed industry, including LT implementation experience in a developing country.
3. A sound understanding of the issues involved in producing and processing high quality seed in a developing country environment.
4. Proven technical skills in the following areas:
    a. Seed production systems, including both true seed and vegetatively propagated species;
    b. Seed processing and handling, with an emphasis on use of technology that is appropriate in a developing country context;
    c. Implementation of QA procedures covering seed production, processing and distribution;
    d. Development of national seed system planning and management systems; and
    e. Interfacing with extension support services for seed production and distribution activities.
5. Demonstrated ability to establish strong working relationships with and coordinate a small team of national counterparts.
6. Well developed skills in: inter-personal communication; report writing; numeracy; and networking.
7. Basic computer literacy.
8. Fluency in English.

Desirable

1. Experience in SE Asia or East Timor.
2. Basic proficiency in either Tetun, Bahasa Indonesia or Portugese.

East Timor Seeds of Life Program

TERMS OF REFERENCE

Position Title: Informal Seed Production Adviser (ISPA)

1. BRIEF EXPLANATION OF ROLE

Responsible to: the SoL Australian Team Leader.

Works together with: (i) the Director of NDACD and, through the Director, staff of NDACD; (ii) MAF staff from the District Extension Offices, down to the Suco Extension Officers

Location: Dili, with travel to districts as required.

Duration: 5 years from January 2011 through to December 2015.

2. GENERAL DESCRIPTION:

The ISPA will:

- take the lead in providing support to MAF for the implementation of Component 3 (Informal Seed Production and Distribution), ensuring it is implemented in accordance with the intention of the PDD, the RoU between ACIAR and AusAID, and approved Annual Plans;
- establish and maintain a close primary counterpart relationship with the Director of the NDACD, and through him work closely to build the capacity of the Directorate and the District Extension Services to promote the production of informal seed by CSPGs;
- design, manage the implementation of, and evaluate a range of pilot activities designed to stimulate the market-based exchange of informal seed; and
- support the SoLTL with the implementation of Component 4 activities (Seed System Management), as required.

3. KEY TASKS AND RESPONSIBILITIES

The ISPA will:

1. Establish a close working relationship with the Director of NDACD as the primary counterpart, and actively guide and mentor staff of the Directorate involved in the implementation of Component 3 activities.
2. Advise on the development of CSPGs as a mechanism for producing and distributing informal seed, in terms of number, composition and location of groups; type and duration of support required; and development of linkages (e.g. with FSMGs and focal seed merchants) for distribution of informal seed produced.
3. Monitor and evaluate the development of CSPGs and progressively refine the implementation model on the basis of results achieved.
4. Advise on the development of FSMGs as a mechanism for helping link CSPGs with markets and for expanding their overall scope of activities, in terms of number, composition and location of groups; type and duration of support required; and development of market linkages for on-sale of seed.
5. Identify potential focal seed merchants in district markets and provide support to facilitate their development as an outlet for the sale of improved seed by CSPGs, FSMGs, and individual farmers.
6. Organise seed fairs as a means of helping to monetise seed producers and improve access to seed for seed-insecure farmers.

7. Monitor and evaluate the development of FSMGs, focal seed merchants, and seed fairs as mechanisms for helping to promote the market-based distribution of improved seed, and progressively refine the implementation model on the basis of results achieved.
8. Develop and implement a system to improve the flow of information and facilitate trade between suppliers and buyers of improved seed, including information on potential suppliers, volume of supply available, potential buyers and volume of demand.
9. Identify the need for, plan and manage the implementation of targeted capacity building activities designed to support the professional development of MAF extension staff involved in developing CSPGs and FSMGs.
10. Guide M&E/SOSEK Unit investigations undertaken to gain a richer understanding of the informal seed system and how it works, e.g. in terms of gaining a better understanding of the role of farmer-to-farmer seed exchange; and a better understanding of the ways farmers manage their own seed and variety security.
11. Identify the need for and advise MAF on the development of new/ revised policies and procedures/ systems required to stimulate the development of informal seed production and distribution systems.
12. Plan, coordinate and monitor the activities of the 3 Regional Advisers insofar as they relate to implementation of Component 3 activities.
13. Provide input as required for the development of improved variety technical and promotional materials.
14. Assist the ATL with overarching activities designed to strengthen MAF's capacity to manage the national seed system as required (i.e. Component 4 activities).
15. Assist the ATL to establish and manage systems for planning, monitoring and evaluating program activities.

4. SKILLS AND EXPERIENCE
(Qualifications/Experience/Skills/Knowledge)

The successful candidate will have:

Essential

1. A post-graduate degree from a recognized University in the development of informal seed systems.
2. At least 5 year's experience working with the development of informal seed systems, including LT implementation experience in a developing country.
3. A sound understanding of the issues and dynamics involved in producing and distributing seed through informal systems.
4. Proven technical skills in the following areas:
    a. Mechanisms for stimulating the production of informal seed;
    b. Mechanisms for stimulating market-based exchange mechanisms; and
    c. Improving access for marginalised groups to improved seed.
5. Demonstrated ability to establish strong working relationships with and coordinate a small team of national counterparts.
6. Well developed skills in: inter-personal communication; report writing; numeracy; and networking.
7. Moderate computer literacy.
8. Fluency in English.

Desirable

1. Experience in SE Asia or East Timor.
2. Basic proficiency in either Tetun, Bahasa Indonesia or Portugese.

East Timor Seeds of Life Program

TERMS OF REFERENCE

Position Title: Regional Advisers (RA) – 3 positions

1. BRIEF EXPLANATION OF ROLE

Responsible to: the SoL Australian Team Leader, through the LT Advisers embedded in Components 1-3.

Works together with: District-level MAF staff.

Location: District-based, with travel to Dili as required. Each RA will cover 3-4 districts, and will be required to travel frequently between their assigned districts.

Duration: 5 years from January 2011 through to December 2015.

2. GENERAL DESCRIPTION:

The RAs will:

- establish and maintain a close primary counterpart relationship with the Directors of the District MAF Offices within their respective territories;
- play the lead role in helping to coordinate the implementation of Program activities at District level, providing an operational interface between the Program and the Districts.

3. KEY TASKS AND RESPONSIBILITIES

The RAs will:

1. Establish a close working relationship with the Directors of the District MAF Offices as primary counterparts, and actively guide and mentor staff of the District Offices involved in the implementation of Program activities.
2. Advise and support MAF district staff involved in implementation of the on-farm trial and demonstration program under Component 1.
3. Advise and support MAF district staff involved in planning and managing the distribution of formal seed under Component 2 including assessment of preferred recipients, quantities required, distribution channels, organisation of distribution logistics, and implementation of extension/ demonstration activities in conjunction with seed distribution to ensure that distributed seed is used in the most effective manner.
4. Advise and support MAF district staff involved in establishing CSPGs as a means of increasing production of informal seed, under Component 3.
5. Provide support for the development of FSMGs, focal seed merchants, and seed fairs as mechanisms for helping to promote the market-based distribution of improved seed, under Component 3.
6. Support the implementation of targeted capacity building activities designed to support the professional development of MAF staff at district and sub-district levels. This will include but not be limited to:
    a. developing the capacity of OFDT Coordinators to manage the OFDT program;
    b. developing the capacity of MAF district-level extension staff to plan and manage seed distribution activities;
    c. developing the capacity of subdistrict extension staff and SEOs to ensure that distributed formal seed is used in the most effective manner by recipient farmers; and

   d. developing the capacity of subdistrict extension staff and SEOs to support the establishment and operation of CSPGs.
7. Facilitate field evaluation activities of the M&E/ SOSEK Unit.
8. Assist with the dissemination of improved variety technical and promotional materials.
9. Assist with the organisation of improved variety mass media campaigns at district-level.
10. Provide inputs as required to Program reports and monitoring activities.

4. SKILLS AND EXPERIENCE
(Qualifications/Experience/Skills/Knowledge)

The successful candidates will have:

Essential

1. A graduate degree in agricultural science or equivalent from a recognized University.
2. Demonstrated understanding of and some experience in the application of research and extension methods in a developing country.
3. Previous work experience in SE Asia.
4. Strong communication skills.
5. Demonstrated ability to work as part of a Team.
6. Willingness to work independently in remote and isolated areas.
7. Fluency in English and at least basic proficiency in either Tetun, Bahasa Indonesia or Portugese.

Desirable

1. Experience in East Timor.
2. Training or capacity building experience.
3. Management experience.
4. Post-graduate qualifications in agriculture.

East Timor Seeds of Life Program

TERMS OF REFERENCE

Position Title: M&E/ SOSEK Adviser (M&E/SA)

1. BRIEF EXPLANATION OF ROLE

Responsible to: the SoL Australian Team Leader.

Works together with: (i) staff of the M&E/SOSEK Unit; (ii) the Director of NDP&P; (iii) ST M&E Specialist.

Location: Dili, with travel to districts as required.

Duration: 5 years from January 2011 through to December 2015.

2. GENERAL DESCRIPTION:

The M&E/SA will:

- establish and maintain a close counterpart relationships with the staff of the M&E/SOSEK Unit; and the Director of NDP&P;
- provide guidance and operational support to the M&E/ SOSEK Unit related to monitoring of Program outcomes ('to prove') as well as conducting broader research and evaluation activities providing a basis for continuous learning and Program improvement as an integral part of Program implementation ('to improve');
- assist the SoLTL with the preparation of routine progress and monitoring reports.

3. KEY TASKS AND RESPONSIBILITIES

The M&E/SA will:

1. Establish a close working relationship with the staff of the M&E/ SOSEK Unit as primary counterparts, and actively guide and mentor the Unit in relation to the design, implementation, analysis and reporting of M&E activities.
2. Ensure that the activities of the Unit are integrated with the operations of the NDP&P and the broader M&E Framework of MAF to the maximum extent possible.
3. Assist the ST M&E Specialist with finalisation of the SoL III MEF and initial set-up of M&E procedures.
4. In consultation with staff from the M&E/ SOSEK Unit, SoLTL, other LT Advisers, and the ST M&E Specialist, establish an annual plan of activities to be undertaken each year, covering assessment of outcomes and impacts as well as broader research and evaluation activities providing a basis for continuous learning and Program improvement.
5. Provide support for the design and implementation of field evaluation activities, with particular emphasis on ensuring that the information gathered is of appropriate resolution and quality to meet the purpose for which it is being collected.
6. Assist with the analysis and reporting of data collected, ensuring that reports are produced in a form that can be easily accessed, understood and applied by key target audiences.
7. Ensure that all field evaluations and investigations are designed to take appropriate account of gender issues, where relevant.
8. Together with staff from the M&E Unit and Director of NDP&P, actively promote key results and findings to target audiences, both within and outside MAF, and use of these results as a basis for refinement of Program approaches.

9. Identify the need for, plan and manage the implementation of targeted capacity building activities designed to support the professional development of M&E/SOSEK Unit staff in areas such as social research methods and analysis and reporting of results.
10. Assist the ATL with preparation of progress and monitoring reports.

4. SKILLS AND EXPERIENCE
(Qualifications/Experience/Skills/Knowledge)

The successful candidate will have:

Essential

1. A graduate degree in agricultural science, social science or equivalent from a recognized University.
2. Demonstrated understanding of and some experience in the development and implementation of M&E for agricultural development programs.
3. Demonstrated understanding of and some experience in the application of socio-economic research methods in the context of a development program.
4. Previous work experience in SE Asia.
5. Strong communication skills.
6. Strong analytical and report writing skills.
7. Advanced computer literacy.
8. Demonstrated ability to work as part of a Team.
9. Willingness to work independently in remote and isolated areas.
10. Fluency in English and at least basic proficiency in either Tetun, Bahasa Indonesia or Portugese.

Desirable

1. Experience in East Timor.
2. Training or capacity building experience.
3. Management experience.
4. Post-graduate qualifications in agriculture.

East Timor Seeds of Life Program

TERMS OF REFERENCE

Position Title: Climate Change Adviser (CCA)

1. BRIEF EXPLANATION OF ROLE

Responsible to: the SoL Australian Team Leader.

Works together with: The Directors of NDR&SS and NDA&H, and through them staff of the 2 Directorates.

Location: Dili, with travel to districts as required.

Duration: 3 years from January 2011 through to December 2014.

2. GENERAL DESCRIPTION:

The CCA will:

- establish and maintain close counterpart relationships with the Directors of the NDR&SS and NDA&H;
- Provide technical support to these Directorates in relation to assessing the likely impacts of climate change on foodcrop production in TL, and developing appropriate responses.

3. KEY TASKS AND RESPONSIBILITIES

The CCA will:

1. Establish a close working relationship with the Directors of the NDR&SS and NDA&H as primary counterparts, and actively guide and mentor staff of these Directorates on climate change issues.
2. Analyse how climate is likely to change in TL in the medium term as a result of global warming, and how this is likely to impact on food crop production and national food security. Spatial variation of climate change *within* TL will also need to be considered.
3. Lead the MAF/SoL Program in identifying strategies and priorities that build national food security by buffering farming systems from projected climate change impacts. Specific response strategies might include:
    - advice on the selection of species/ varieties that are better adapted to climate change;
    - use of a more diverse range of species/ varieties;
    - adjustment of sowing dates, seeding rates, ratio of various crops grown and production areas;
    - soil improvement through incorporation of N-fixing legumes into the system and crop residue retention;
    - improved weed control, intercropping and other adaptive agronomic practices.
4. Ensure that reports are produced in a form that can be easily accessed, understood and applied by key target audiences.
5. Actively promote key results and findings to target audiences, both within and outside MAF.
6. Correlate SoL's multi-year OFDT yield data with local climate data to provide a field-based assessment of the actual impacts of climate change on yields, providing a possible basis for crop yield and food security projections.
7. Assist MAF/SoL to coordinate with other research groups (especially UNTL), as well as with suitable international R&D agencies, to support priority areas of research related to climate change.

8. Contribute to the development of a formal climate change adaptation policy and implementation strategy within MAF, and liaise with donors regarding potential assistance for implementation of the strategy.
9. Identify the need for, plan and manage the implementation of targeted capacity building activities designed to support the professional development of MAF staff in relation to assessing the potential impact of and planning for climate change.

4. SKILLS AND EXPERIENCE
(Qualifications/Experience/Skills/Knowledge)

The successful candidate will have:

Essential

1. A graduate degree in environmental science or agricultural science from a recognized University.
2. Demonstrated understanding of and experience in analysing available data sets to assess the likely nature of climate change in a particular area.
3. Demonstrated understanding of and experience in assessing the possible impact of climate change on crop production and development of strategies responding to these impacts.
4. Strong communication skills.
5. Strong analytical and report writing skills.
6. Advanced computer literacy.
7. Demonstrated ability to work as part of a Team.
8. Fluency in English.

Desirable

1. Experience in SE Asia or East Timor.
2. Training or capacity building experience.
3. Post-graduate qualifications in environmental science or agricultural science.
4. Basic proficiency in either Tetun, Bahasa Indonesia or Portugese.

Appendix 10: AusAID-ACIAR Partnership Engagement Plan, SOL III

This document outlines how AusAID and ACIAR will work together during the design of SoL III. It provides the rationale behind the partnership and clarifies the roles and responsibilities of the two agencies, including funding, reporting, monitoring and evaluation arrangements.

Rationale for cooperation

SoL I (2000-2005) was fully funded and managed by ACIAR. In 2005, AusAID became a funding partner for SoL II, recognising that the program was moving closer towards development orientated objectives. SoL III will produce a further shift in program orientation to development-based objectives. It has been proposed that SoL III will continue to use existing management and funding arrangements in place under SoL II, in which the program was managed by ACIAR and predominantly funded by AusAID. Maintaining the current management and implementation arrangements will also:

- Ensure relationships between the SoL implementation team and MAF are maintained;
- Reduce management costs, ACIAR does not charge any management overheads;
- Provide strong fiduciary control over program expenditure through ACIAR's relationships with implementing partners;
- Bypass the need for a competitive tender process which would disrupt program implementation and potentially risk existing relationships between the SoL implementation team and counterparts.

ACIAR has significant in-house technical expertise in relation to agricultural research and agricultural development. It also has good access to external specialist skills through well-developed networks with Australian and international centres of expertise. However, it has limited financial resources and no support office in East Timor. AusAID has capabilities in a range of complementary fields, such as development policy, institutional development, and performance monitoring and evaluation. It has significant financial resources and a well-resourced support team based at the Embassy in Dili.

Objectives of cooperation

The objectives of an ACIAR-AusAID partnership in regard to SoL III are

i. To ensure effective ACIAR-AusAID coordination in the aid program's support to agricultural development and food security in East Timor.

ii. To minimise the management overhead costs of program implementation.

iii. To maintain momentum and ensure smooth transition from SoL II to SoL III.

iv. To harness the complementarities of skills and resources between ACIAR and AusAID to combine these effectively for program implementation.

Respective roles and responsibilities

ACIAR and AusAID will jointly manage the design of SoL III. AusAID and ACIAR have agreed to combine and streamline their formal design processes for SOL III, including independent appraisal, peer review, Quality at Entry reporting and formal approval of the design. ACIAR and AusAID will have a joint stake in managing the following design related processes:

- selection of the design team;
- drafting of terms of reference for the design mission(s);
- briefing and de-briefing of the team leader (and other team members of team);
- approval of aide memoire from design mission;
- official representation on the design mission;

- selection of independent appraisers of the design document;
- participation in the peer review of the design document;
- agreement on Quality at Entry report ratings, formal minutes from the peer review and required changes to the design document;
- preparation of agreements between ACIAR, AusAID and MAF, including the subsidiary agreement to Record of Understanding; and,
- preparation of Ministerial Submission for Seeds of Life III.

The proposed schedule for the design process is as follows:

Date	Task	Responsibility
9 Mar	SoL III Design Terms of Reference finalised	ACIAR, AusAID
12 Mar	Contracting of Design Team Finalised	AusAID
16 Mar	Canberra briefing for TL and Agricultural Econ & Institutional Specialist	ACIAR, AusAID
18 Mar	Design mission and fieldwork commences in-country	Team Leader (TL)
30 Mar	Design team submit progress report to MAF, SoL imp. team, ACIAR, AusAID	TL, Design Team
31 Mar	Design team brief ACIAR and AusAID on progress	ACIAR, AusAID, TL
1 April	Design team depart Dili	TL
9 Apr	Independent Appraisers selected by ACIAR and AusAID	ACIAR, AusAID
12 Apr	Second in-country mission commences (Team Leader, Ag Economist)	TL
16 Apr	Team Leader submit aid memoire to MAF, ACIAR and AusAID	TL, Design Team
16 Apr	ACIAR and AusAID management meeting to discuss aide memoire	ACIAR, AusAID, TL
16 Apr	Finalise contracting of Independent Appraisers	AusAID
23 Apr	De-brief Team Leader and Agricultural Economist & Institutional Specialist	AusAID
24 Apr	Team Leader and Agricultural Economist & Institutional Specialist depart Dili	TL
30 Apr	Draft PDD finalised and provided to MAF, ACIAR and AusAID	TL, Design Team
30 Apr	Draft PDD provided to Independent Appraisers and SoL Steering Committee	ACIAR, AusAID
21 May	Independent Appraisal(s) of PDD submitted to MAF, ACIAR, AusAID and TL	ACIAR, AusAID, TL
28 May	All other comments on PDD to be provided to MAF, ACIAR, AusAID and TL	ACIAR, AusAID, TL
1 Jun	Joint ACIAR-AusAID Peer Review of design document conducted	ACIAR, AusAID, TL
4 Jun	Joint ACIAR-AusAID Peer Review Minutes approved and circulated	ACIAR, AusAID
11 Jun	Final PDD submitted to MAF, ACIAR and AusAID	TL, Design Team
18 Jun	FMA Reg 9 & 10 approval and Ministerial Submission	ACIAR, AusAID
2 Jul	ACIAR and AusAID to finalise Subsidiary Arrangement to RoU	ACIAR, AusAID
16 Jul	AusAID clearance of agreement	ACIAR, AusAID
23 Jul	ACIAR and AusAID signature of agreement	ACIAR, AusAID
13 Aug	Preparation of formal agreements with MAF	ACIAR, AusAID
1 Sep	Implementation commences	ACIAR

ACIAR – AusAID Management Reference Group

ACIAR and AusAID management will meet to discuss the SoL III design on 16 April 2010. An aide memoire will be prepared before this meeting. ACIAR and AusAID will discuss progress and provide further guidance as needed. The management group may also choose to convene at other points during the design process where management direction is needed to progress the design.

Appraisal Peer Review and approval of Design

The draft design document will be considered by the Seeds of Life Steering Committee prior to the Joint AusAID-ACIAR Peer Review (equivalent to ACIAR's Phase 2 or full proposal review and AusAID's Appraisal Peer Review), to ensure that the views of the Government of East Timor are available. ACIAR and AusAID will select 2-4 independent appraisers of the draft design document. These appraisals will be discussed during the Joint Peer Review which will be chaired by AusAID. The peer review will also agree on a Quality at Entry assessment of the Program, as required by AusAID's processes. Formal Minutes of the Joint Peer Review will be approved by ACIAR and AusAID and circulated. Provided the design document is approved, AusAID and ACIAR will seek formal FMA Reg 9 and 10 approvals for SoL III. A new sub-agreement under the ACIAR AusAID Record of Understanding will be drafted after final approval for SoL III.

Reporting, Monitoring and Evaluation

During SoL II AusAID Post has maintained contact with the SoL implementing team, participated in Steering Committee meetings and participated in Technical Advisory Committee missions. An AusAID adviser and an ACIAR Research Program Manager have also participated in all TAG missions and provided additional advisory inputs on an as needs basis. ACIAR has provided six-monthly progress reports to AusAID and an Annual Report in ACIAR monitoring format. Broadly similar arrangements are envisaged for SoL III, although the design team may recommend enhancements to these arrangements.

Both AusAID and ACIAR have formal requirements for completion reporting for SoL II in 2010. These requirements will again be integrated. ACIAR will conduct an End of Project Review and prepare a report in ACIAR format. AusAID and ACIAR will then jointly commission an Independent Completion Report (ICR) that satisfies AusAID requirements, using the ACIAR End of Project Review as a base document. If the timing were appropriately managed, it may be possible to include the ICR in the package of documents considered in the Appraisal Peer Review.

Similar joint completion reporting processes are envisaged for SoL III. A joint AusAID/ACIAR/MAF mid-term review of SoL III is envisaged. The design team will address this requirement in more detail in developing the design document. ACIAR and AusAID also envisage a detailed ex-post evaluation of the SoL program some years following completion, SoL III will need to prepare the ground for this.

Funding and Financial Management

AusAID and ACIAR will both contribute to the cost of the design process. ACIAR will have responsibility for financial management of Australia's contributions to the implementation of SoL III, in partnership with its commissioned organisations, and in consultation with MAF. This will be guided by ACIAR's own financial management systems and accountabilities.

AusAID and MAF will contribute to the overall cost of the Program. Details of the respective contributions of AusAID, ACIAR and MAF are yet to be finalised. However, AusAID has been allocated funding from the recent Food Security through Rural Development budget initiative to support the implementation of SOL III, as follows:

2010-11	2011-12	2012-13
$2m	$3m	$4m

AusAID further expects that allocations similar to that of 2012-13 will be available for years 4 and 5 of SoL III. AusAID therefore has around $17 million to invest in SoL III over the proposed five year life of the Program. ACIAR will provide $3 million over the duration of SoL III, as follows:

2010-11	2011-12	2012-13	2013-14	2014-15
$600,000	$600,000	$600,000	$600,000	$600,000

This creates a total budget envelope of $20 million over the five year program.

Dispute Resolution

The working relationship between AusAID and ACIAR for the purposes of Seeds of Life is now well developed after four years of implementation. However, these arrangements can be reviewed and potentially improved upon during the design process. In terms of formal dispute resolution processes, this will be addressed in the new sub-agreement to ROU 14376 for SOL III, as they are in the current sub-agreement for SOL II.

Volume 2 References:

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